# AP58

## User's Guide

**Printed in Taiwan**

**PART NO.:49.86401.101**
**DOC. NO.: AP58-1-E9802C**

# AP58
# Mainboard

User's Guide

**Document Number : AP58-1-E9802C**
**Model and Version : For AP58 version 1.xx**
**Manual Version : English, version C**
**Release Date : Feb 5, 1998**

***More help for latest information:***

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## Purpose and Scope

This manual tells how to install and configure the system board.

## Organization

This manual consists of three chapters and one appendix:

Chapter 1, **Overview**, covers the introduction and specifications of the system board.

Chapter 2, **Hardware Installation**, describes hardware jumpers, connectors and memory configuration. There are user friendly drawings to locate jumper and connector.

Chapter 3, **AWARD BIOS**, explains the system BIOS and tells how to configure the system by setting the BIOS parameters.

Chapter 4, **Installing System Component**, includes 3D drawing and step by step procedures for first time DIY user to install the system board, CPU, SIMM/DIMM, cable and add expansion cards.

Appendix A, **Jumper Table Summary**, gives you a tabular summary of the jumper settings discussed in Chapter 2.

Appendix B, **Frequently Asked Question**, collects most frequently asked question of this product.

Appendix C, **Troubleshooting Guide**, includes first aid information you need if you meet trouble, the WWW address and worldwide service telephone/fax are also included.

Appendix D, **AOpen Best Products**, includes the best sale and recommended product specifications of AOpen.

## Conventions

The following conventions are used in this manual:

| | |
|---|---|
| `Text entered by user, default settings, recommended selections` | Represent text input by the user, default settings and recommended selections |
| <Enter>, <Tab>,<Ctl>, <Alt>, <Ins>, <Del>, etc | Represent the actual keys that you have to press on the keyboard. |

**Note:**
Gives bits and pieces of additional information related to the current topic.

**Warning:**
Alerts you to any damage that might result from doing or not doing specific actions.

**Caution:**
Suggests precautionary measures to avoid potential hardware or software problems.

**Important:**
Reminds you to take specific action relevant to the accomplishment of the procedure at hand.

**Tip:**
Tells how to accomplish a procedure with minimum steps through little shortcuts.

# Contents

# Chapter 1

# Overview

The AP58 is a high-performance Pentium®-based system board that utilizes the PCI/ISA architecture and **Baby AT** form factor. It integrates the **SIS 5582** PCIset, a Super I/O controller, and a PCI mode 4 enhanced IDE controller with bus master and **Ultra DMA/33** to enhance system performance. It has **256KB** or **512KB** pipelined-burst second-level cache onboard and support four single in-line memory module (SIMM) plus two Dual in-line memory module (DIMM) that allows to **mix EDO and SDRAM** memory and expansion up to a maximum of 384MB.

AP58 also implements:

**Suspend To Hard Drive**

"Immediately" turns on system and goes back to the original screen before power down. You can resume your original work directly from hard disk without go through the Win95 booting process and run your application again. Suspend to Hard Drive saves your current work (system status, memory image) into hard disk. Note that you have to use VESA compatible PCI VGA (AOpen S3 PCI PV70/PT70), Sound Blaster compatible sound card with APM driver (AOpen AW35/MP56), Rockwell compatible Modem (AOpen F56/MP56) for Suspend to Hard Drive to work properly.

**High Efficient Synchronous Switching Power Regulator**

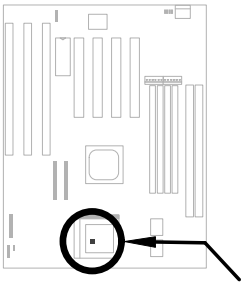
Most of the current switching designs are Asynchronous mode, which from the technical point of view, still consumes very high power as well as heat. AOpen AP58 implements high efficient Synchronous switching design that the temperature of MOS FET is less than 36 degree C comparing with 57 degree Schottky diode of Asynchronous design.

### 3V Over-current Protection

The Over Current Protection was very popular implemented on the Baby AT or ATX +5V/+12V switching power supply. It is very useful to prevent accidental short circuit when you install the mainboard, HDD, add-on cards into housing. But unfortunately, the new generation CPU and chipset use 3.3V/2.8V Voltage which has regulator to transfer 5V to 3.3V (Vcpuio, chipset, PBSRAM, SDRAM) and 2.8V (CPU Vcore), and makes 5V Over Current Protection useless. AOpen AP58 supports 3.3V and 2.8V Over Current Protection, in conjunction with 5V/12V power supply provide the full line Over Current Protection.

### CPU Thermal Protection

This mainboard implements special thermal protection circuit below the CPU. When temperature is higher than a predefined value, the CPU speed will automatically slow down and there will be warning from BIOS and also utility software (for example, aohw100, a hardware monitor utility which you can download from AOpen's website). This feature is automatically implemented by BIOS and software, no hardware installation is needed.



***Note:*** *AP58 intends to implement the new power management features* ***ACPI.*** *But ACPI is a specification of PC97, it is not fully defined yet. Although AOpen will try the best to support ACPI (normally, through BIOS modifications), it is still possible that AP58 can not fully comply ACPI specification.*

## 1.1 Specifications

| | |
|---|---|
| **Form Factor** | Baby AT |
| **Board Size** | 220 mm x 280 mm |
| **CPU** | Intel Pentium Processor P54C, PP/MT (P55C), AMD K5/ K6, Cyrix 6x86/M2 and IDT C6. |
| **System Memory** | FPM (Fast Page Mode) or EDO (Extended Data Output) 72-pin SIMM x4, and SDRAM 168-pin x2 maximum 384MB. |
| **Second-level Cache** | 256KB or 512KB pipelined-burst cache onboard |
| **Chipset** | SiS 5582 PCIset (480-pin BGA Package) |
| **Expansion Slots** | ISA x3 and PCI x4 |
| **Serial Port** | Two serial ports UART 16C550 compatible |
| **Parallel Port** | One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP). |
| **Floppy Interface** | Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format |
| **IDE Interface** | Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 , bus master hard disk drives and Ultra DMA/33 mode hard drives are also supported. |
| **USB Interface** | Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard. |
| **PS/2 Mouse** | PS/2 mouse supported by PS/2 mouse bracket. |
| **Keyboard** | Default AT compatible keyboard, mini-DIN PS/2 keyboard connector is optional. |
| **RTC and Battery** | RTC build in chipset, Lithium (CR-2032) battery. |
| **BIOS** | AWARD Plug-and-Play Flash ROM BIOS |
| **Switching Regulator** | High efficient synchronous switching regulator |
| **3V Over-current Protection** | 3.3V 10A and 2.8V/2.9V (CPU core) 15A over-current protection to prevent any accident short circuit. |
| **CPU Thermal Protection** | Warning when CPU temperature is higher than a predefined value. |

# Chapter 2

# Hardware Installation

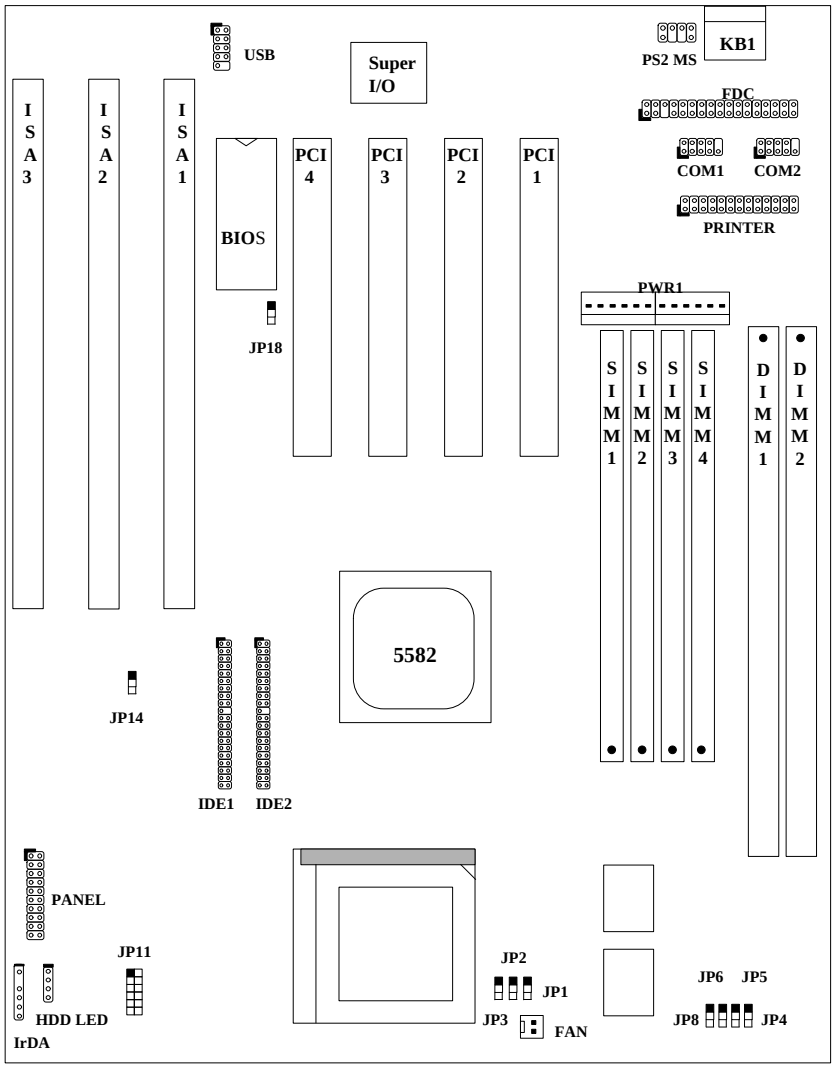
This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.

***Caution:*** *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

1. *Do not remove a component from its protective packaging until you are ready to install it.*
2. *Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.*

## 2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



***Jumpers:***

| | |
|---|---|
| *JP1,JP2,JP3:* | *CPU frequency ratio* |
| *JP4,JP5,JP6:* | *CPU external (bus) clock* |
| *JP8:* | *Setting PCI clock* |
| *JP11:* | *CPU core voltage setting (Vcore)* |
| *JP14:* | *Clear CMOS* |
| *JP18:* | *Onboard Super I/O enable/disable* |

***Connectors:***

| | |
|---|---|
| *KB1:* | *AT keyboard connector* |
| *PWR1:* | *AT (PS/2) power connector* |
| *PS2 MS:* | *PS/2 mouse connector* |
| *USB:* | *USB connector* |
| *COM1:* | *COM1 connector* |
| *COM2:* | *COM2 connector* |
| *FDC:* | *Floppy drive connector* |
| *PRINTER:* | *Printer connector* |
| *IDE1:* | *IDE1 primary channel* |
| *IDE2:* | *IDE2 secondary channel* |
| *FAN:* | *CPU fan connector* |
| *IrDA:* | *IrDA (Infrared) connector* |
| *HDD LED:* | *HDD LED connector* |
| *PANEL:* | *Front panel (Multifunction) connector* |

## 2.2 Jumpers

Jumpers are made by pin headers and plastic connecting caps for the purpose of customizing your hardware. Doing so requires basic knowledge of computer hardware, be sure you understand the meaning of the jumpers before you change any setting. The onboard jumpers are normally set to their default with optimized settings.

On the mainboard, normally there is a bold line marked beside pin 1 of the jumper, sometimes, there are numbers also. If we connect (short) plastic cap to pin 1 and 2, we will say set it at 1-2, and when we say jumper is open, that means no plastic cap connected to jumper pins.


Open


Short

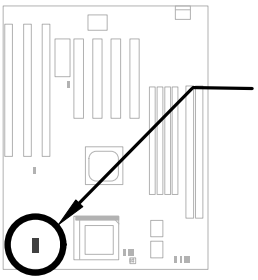

Jumper set at 1-2

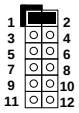
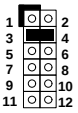
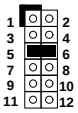
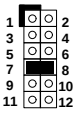
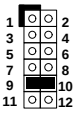

Jumper set at 2-3

## 2.2.1 Setting the CPU Voltage

| JP11 | CPU Core Voltage (Vcore) |
|---|---|
| 1-2 | 3.45V (Intel P54C or IDT C6) |
| 3-4 | 3.52V (Cyrix 6x86, AMD K5 or IDT C6) |
| 5-6 | 2.9V (AMD K6-166/200 or Cyrix M2) |
| 7-8 | 2.8V (MMX P55C, Cyrix 6x86L) |
| 9-10 | 3.2V (AMD K6-233) |
| 11-12 | 2.2V (AMD K6-266/300) |

**JP11** is used to select CPU core voltage (Vcore), normally it is set to default 3.45V for INTEL Pentium P54C. It must be changed if you have CPU with different core voltage. Please refer to the CPU specification for more details.



| JP11 | JP11 | JP11 | JP11 | JP11 |
|---|---|---|---|---|
|  |  |  |  |  |
| 3.45V | 3.52V | 2.9V | 2.8V | 3.2V |
| P54C<br>IDT C6 | 6x86 or K5<br>IDT C6 | K6-166<br>K6-200<br>M2 | P55C<br>6x86L | K6-233 |

***Warning:*** *Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6-200/233 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.*

***Warning****: If your CPU is IDT C6, note that this processor supports one of two voltage range, 3.135 ~ 3.465V ( 3.45V) and 3.45 ~ 3.6V ( 3.52V). See the CPU specification to set the correct voltage.*

***Tip:*** *Normally, for single voltage CPU, Vcpuio (CPU I/O Voltage) is equal to Vcore, but for CPU that needs dual voltage such as PP/MT (P55C) or Cyrix 6x86L, Vcpuio is different from Vcore and must be set to Vio (PBSRAM and Chipset Voltage). The single or dual voltage CPU is automatically detected by hardware circuit.*

| CPU | Type | JP11 | Vcore |
|---|---|---|---|

| | | | |
|---|---|---|---|
| INTEL P54C | Single Voltage | 1-2 | 3.45V |
| INTEL MMX P55C | Dual Voltage | 7-8 | 2.8V |
| AMD K5 | Single Voltage | 3-4 | 3.52V |
| AMD K6-166/200 | Dual Voltage | 5-6 | 2.9V |
| AMD K6-233 | Dual Voltage | 9-10 | 3.2V |
| AMD K6-266/300 | Dual Voltage | 11-12 | 2.2V |
| Cyrix 6x86 | Single Voltage | 3-4 | 3.52V |
| Cyrix 6x86L | Dual Voltage | 7-8 | 2.8V |
| Cyrix M2 | Dual Voltage | 5-6 | 2.9V |
| IDT C6 | Single Voltage | 1-2<br>3-4 | 3.45V<br>3.52V |

## 2.2.2 Selecting the CPU Frequency

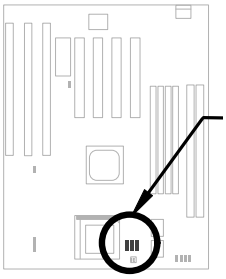
| JP3 | JP2 | JP1 | CPU Frequency Ratio |
|---|---|---|---|
| 1-2 | 1-2 | 1-2 | 1.5x (3.5x) |
| 1-2 | 1-2 | 2-3 | 2x |
| 1-2 | 2-3 | 2-3 | 2.5x (1.75x) |
| 1-2 | 2-3 | 1-2 | 3x |
| 2-3 | 1-2 | 2-3 | 4x |
| 2-3 | 2-3 | 2-3 | 4.5x |
| 2-3 | 2-3 | 1-2 | 5x |
| 2-3 | 1-2 | 1-2 | 5.5x |

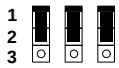
Intel Pentium, Cyrix 6x86 and AMD K5/K6 CPU are designed to have different Internal (Core) and External (Bus) frequency. The ratio of Core/Bus frequency is selected by **JP1, JP2**, which CPU is using to multiply external clock and produce internal frequency. Note that **JP3** is reserved for future CPU.

***Note:*** *Intel PP/MT MMX 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio.*

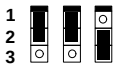
***Core frequency = Ratio * External bus clock***

**JP3 JP2 JP1** **JP3 JP2 JP1**



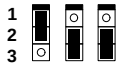



1.5x (3.5x)



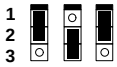

2x

**JP3 JP2 JP1**



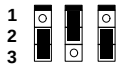

2.5x (1.75x)

**JP3 JP2 JP1**



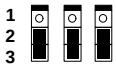

3x

**JP3 JP2 JP1**



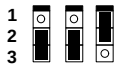

4x

**JP3 JP2 JP1**



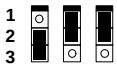

4.5x

**JP3 JP2 JP1**




5x

**JP3 JP2 JP1**



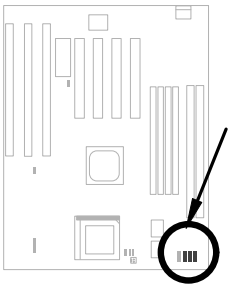

5.5x

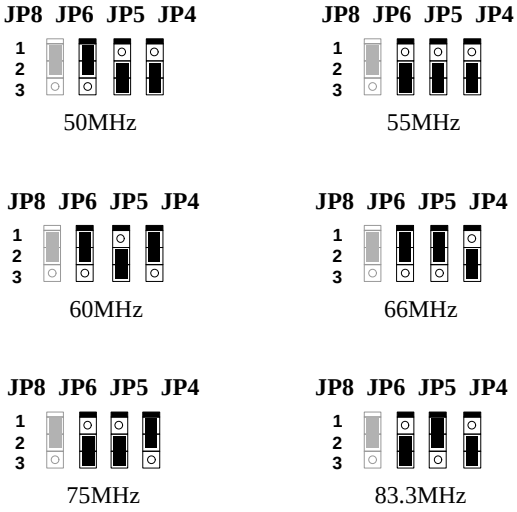
***Note:*** *Intel PP/MT 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio.*

***Note:*** *AP58 can autodetect the CPU type and select CPU burst mode of SIS chipset. (Only SiS chipset provide this feature.) For Cyrix CPU, AP58 will set to Linear Mode for better performance. For Intel and AMD CPU, Toggle Mode is set.*

| JP6 | JP5 | JP4 | CPU External Clock |
|---|---|---|---|
| 1-2 | 2-3 | 2-3 | 50MHz |
| 2-3 | 2-3 | 2-3 | 55MHz |
| 1-2 | 2-3 | 1-2 | 60MHz |
| 1-2 | 1-2 | 2-3 | 66MHz |
| 2-3 | 2-3 | 1-2 | 75MHz |
| 2-3 | 1-2 | 2-3 | 83.3mhz |

**JP4, JP5** and **JP6** are the selections of CPU external clock (bus clock), which is actually the clock from clock generator.






***Warning:*** *SIS 5582 chipset supports maximam 75 MHz external CPU bus clock, the 83.3MHz settings are for internal test only, set to 83.3MHz exceeds the specification of 5582 chipset, which may cause serious system damage.*

***Caution:*** *Following table are possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.*

| INTEL Pentium | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| P54C 75 | 75MHz= | 1.5x | 50MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 2-3 |
| P54C 90 | 90MHz = | 1.5x | 60MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 1-2 |
| P54C 100 | 100MHz = | 1.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| P54C 120 | 120MHz = | 2x | 60MHz | 1-2 & 1-2 & 2-3 | 1-2 & 2-3 & 1-2 |
| P54C 133 | 133MHz = | 2x | 66MHz | 1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3 |
| P54C 150 | 150MHz = | 2.5x | 60MHz | 1-2 & 2-3 & 2-3 | 1-2 & 2-3 & 1-2 |
| P54C 166 | 166MHz = | 2.5x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |
| P54C 200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |

| INTEL Pentium | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| PP/MT 150 | 150MHz = | 2.5x | 60MHz | 1-2 & 2-3 & 2-3 | 1-2 & 2-3 & 1-2 |
| PP/MT 166 | 166MHz = | 2.5x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |
| PP/MT 200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |
| PP/MT 233 | 233MHz = | 3.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |

| Cyrix 6x86 & 6x86L | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| P120+ | 100MHz= | 2x | 50MHz | 1-2 & 1-2 & 2-3 | 1-2 & 2-3 & 2-3 |
| P133+ | 110MHz= | 2x | 55MHz | 1-2 & 1-2 & 2-3 | 2-3 & 2-3 & 2-3 |
| P150+ | 120MHz = | 2x | 60MHz | 1-2 & 1-2 & 2-3 | 1-2 & 2-3 & 1-2 |
| P166+ | 133MHz = | 2x | 66MHz | 1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3 |
| P200+ | 150MHz = | 2x | 75MHz | 1-2 & 1-2 & 2-3 | 2-3 & 2-3 & 1-2 |

| Cyrix M2 | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| 6x86-MX166 | 150MHz = | 2.5x | 60MHz | 1-2 & 2-3 & 2-3 | 1-2 & 2-3 & 1-2 |
| 6x86-MX200 | 166MHz=<br>150MHz= | 2.5x<br>2x | 66MHz<br>75MHz | 1-2 & 2-3 & 2-3<br>1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3<br>2-3 & 2-3 & 1-2 |
| 6x86-MX233 | 200MHz=<br>166MHz | 3x<br>2x | 66MHz<br>83.3MHz | 1-2 & 2-3 & 1-2<br>1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3<br>2-3 & 1-2 & 2-3 |
| 6x86-MX266 | 233MHz= | 3.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |

| IDT C6 | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| C6-150 | 150MHz = | 2x | 75MHz | 1-2 & 1-2 & 2-3 | 2-3 & 2-3 & 1-2 |
| C6-180 | 180MHz = | 3x | 60MHz | 1-2 & 2-3 & 1-2 | 1-2 & 2-3 & 1-2 |
| C6-200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |

| AMD K5 | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| PR75 | 75MHz= | 1.5x | 50MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 2-3 |
| PR90 | 90MHz = | 1.5x | 60MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 1-2 |
| PR100 | 100MHz = | 1.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR120 | 90MHz = | 1.5x | 60MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 1-2 |
| PR133 | 100MHz = | 1.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR166 | 116MHz = | 1.75x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |

| AMD K6 | CPU Core | Ratio | External | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|

| | Frequency | | Bus Clock | | |
|---|---|---|---|---|---|
| PR2-166 | 166MHz = | 2.5x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |
| PR2-200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR2-233 | 233MHz = | 3.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR2-266 | 266MHz= | 4x | 66MHz | 2-3 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3 |
| PR2-300 | 300MHz= | 4.5x | 66MHz | 2-3 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |

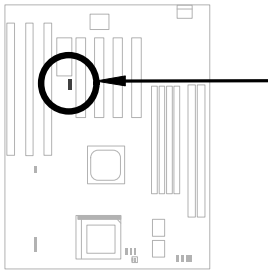
***Note:*** *Cyrix 6x86 and AMD K5 CPU use P-rating for the reference of CPU benchmark compared with INTEL P54C, their internal core frequency is not exactly equal to P-rating marked on the CPU. For example, Cyrix P166+ is 133MHz but performance is almost equal to P54C 166MHz and AMD PR133 is 100MHz but performance is almost equal to INTEL P54C 133MHz.*

***Warning:*** *Although Cyrix 6x86-MX233 supports 83.3MHz x 2 setting, however, set to 83.3MHz exceeds the specification of SIS 5582 chipset, which may cause serious system damage.*

## 2.2.3 Disabling the Onboard Super I/O Controller

| JP18 | Onboard Super I/O |
|---|---|
| 1-2 | Enable (default) |
| 2-3 | Disable |

This mainboard is default to enable the onboard Super I/O controller. In case you wish to use an external I/O control card, you need to disable the onboard I/O before using the external I/O card. To disable it, set the jumper **JP18** to 2-3.



**JP18**


Enable (default)

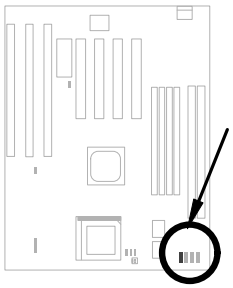
**JP18**


Disable

## 2.2.4 Setting PCI Clock

| JP8 | PCI Clock |
|---|---|
| 1-2 | Sync (default) |
| 2-3 | Async |

**JP8** is used to set PCI clock. The default setting is synchronous, that means PCI clock will be half of external clock. (For example, if CPU external clock is set to 66MHz, then the PCI clock will be 33MHz.) However, the specification of PCI clock is maximum 33 MHz. In order to avoid system unstable, we recommand you set the PCI clock to async if the CPU external clock is set to 75/83.3 MHz.



**JP8**


Sync (default)

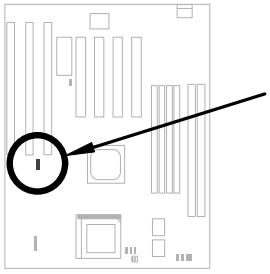
**JP8**


Async

## 2.2.5 Clearing the CMOS

| JP14 | Clear CMOS |
|---|---|
| 1-2 | Normal operation (default) |
| 2-3 | Clear CMOS |

You need to clear the CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:




Normal Operation (default)

Clear CMOS

**The procedure to clear CMOS:**

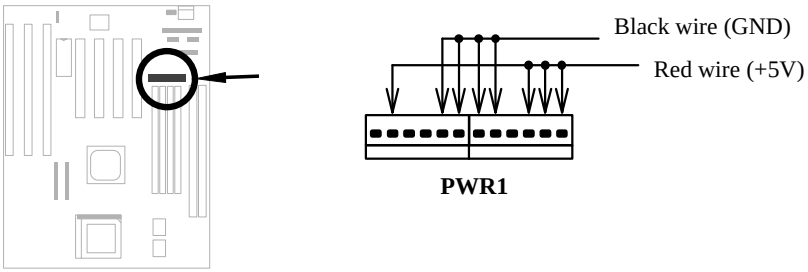
1. Turn off the system power.
2. Locate **JP14** and short pins 2-3 for a few seconds.
3. Return **JP14** to its normal setting by shorting pins 1-2.
4. Turn on the system power.
5. Press [DEL] during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

## 2.3 Connectors

### 2.3.1 Power Cable

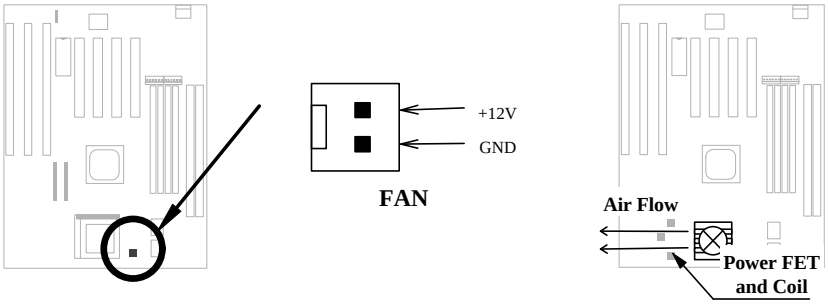
A standard baby AT (PS/2) power supply has two cables with six wires on each. Plug in these cables to the onboard power connector in such a way that all the black wires are in the center. The power connector is marked as **PWR1** on the system board.

***Caution:*** *Make sure that the power supply is off before connecting or disconnecting the power cable.*




### 2.3.2 CPU Fan

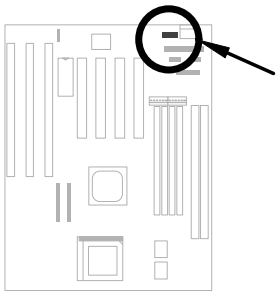
Plug in the fan cable to the two-pin fan connector onboard. The fan connector is marked **FAN** on the system board. Attach the heatsink and fan to the CPU. Check its orientation, make sure the air flow go through the heatsink.

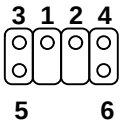


## 2.3.3 PS/2 Mouse

To connect a PS/2 mouse, insert the PS/2 mouse bracket connector to **PS2 MS** on the system board. Then plug in the PS/2 mouse cable to the mouse port on the bracket.

| Pin | Description |
|---|---|
| 1 | MS DATA |
| 2 | NC |
| 3 | GND |
| 4 | +5V |
| 5 | MS CLK |
| 6 | NC |

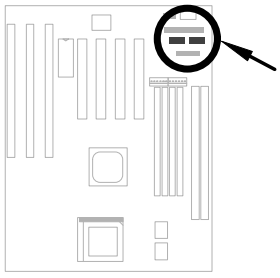


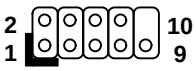



**PS2 MS**

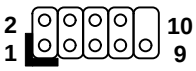
## 2.3.4 Serial Devices (COM1/COM2)

To support serial devices, insert the serial device connector into the serial port on the bracket. Plug in the 10-pin flat cable to the appropriate onboard connectors. The serial port 1 connector is marked as **COM1** and the serial port 2 connector is marked as **COM2** on the system board.






**COM1**

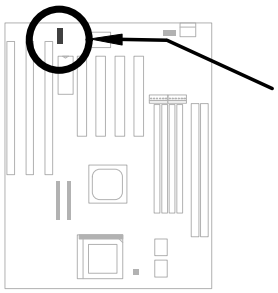


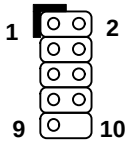

**COM2**

## 2.3.5 USB Device (optional)

You need a USB bracket to have your system to support additional USB device(s). To attach a USB bracket, simply insert the bracket cable to the onboard USB connector marked as **USB.**

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | V0 | 2 | V1 |
| 3 | D0- | 4 | D1- |
| 5 | D0+ | 6 | D1+ |
| 7 | GND | 8 | GND |
| 9 | NC | 10 | NC |

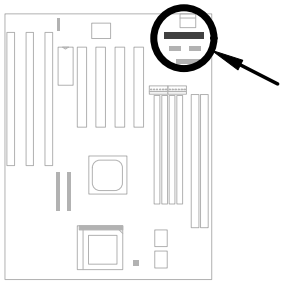


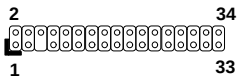



**USB**

## 2.3.6 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC** on the system board.

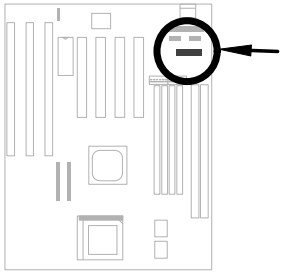


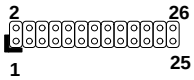



**FDC**

## 2.3.7 Printer

Plug in the 26-pin printer flat cable to the onboard parallel connector marked as **PRINTER** on the board.





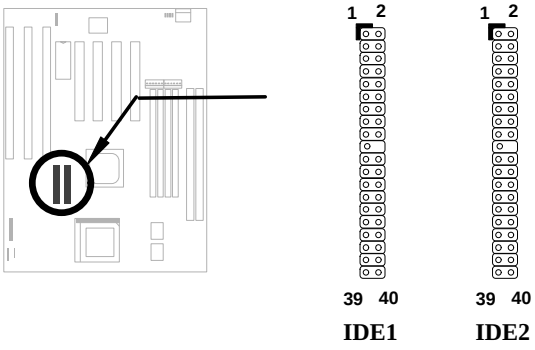

**PRINTER**

## 2.3.8 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2.** IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

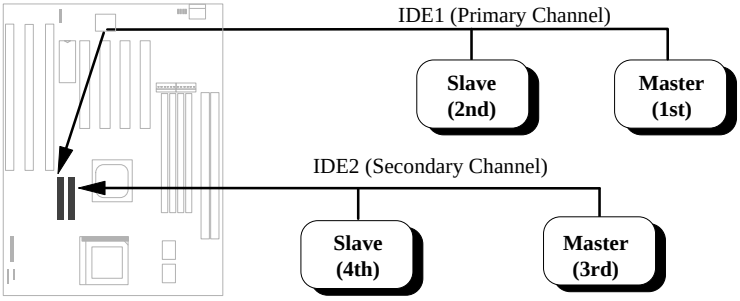
In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.




***Caution**: The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not excess this length.*

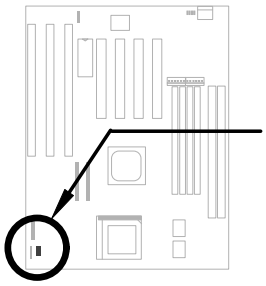
***Caution:** For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device . Please refer to following figure.*

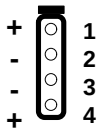


## 2.3.9 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

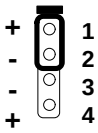
| Pin | Description |
|---|---|
| 1 | HDD LED |
| 2 | GND |
| 3 | GND |
| 4 | HDD LED |





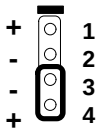

**HDD LED**

4-pin connector




**HDD LED**

2-pin connector at pin 1-2



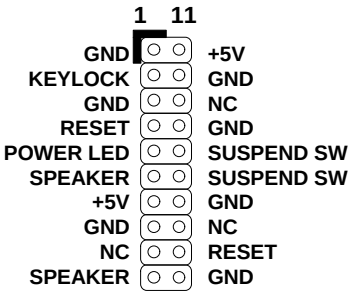

**HDD LED**

2-pin connector at pin 3-4

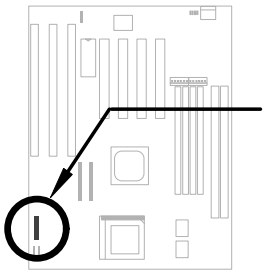
## 2.3.10 Panel Connector

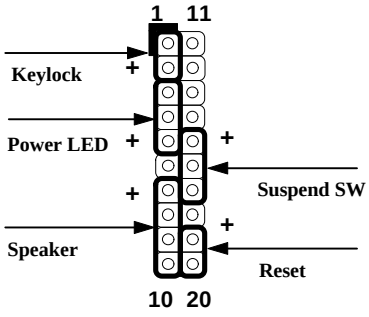
The Panel (multifunction) connector is a 20-pin connector marked as **PANEL** on the board. Attach the power LED, keylock, speaker, reset switch, and suspend switch connectors to the corresponding pins as shown in the figure.

Some housings have a five-pin connector for the keylock and power LED Since power LED and keylock are aligned together, you can still use this kind of connector.



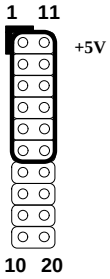

**PANEL**






**PANEL**

Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to PANEL as shown in the figure. Make sure that the red wire of the connector is connected to +5V.




**PANEL**

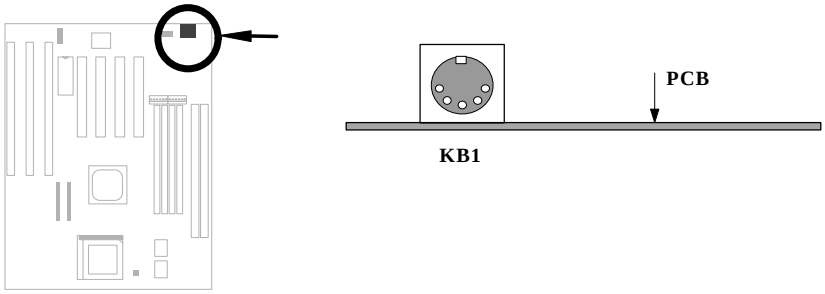
***Note:*** *If your housing comes with Turbo switch connector, you may use this connector for Suspend switch functions.*

***Note****: Pressing the Suspend switch allows you to manually force the system to suspend mode. However, this is possible only if the Power Management function in the BIOS Setup menu is enabled.*

## 2.3.11 Keyboard

The onboard keyboard connector is a five-pin AT-compatible connector marked as **KB1**. The view angle of drawing shown here is  from back panel of the housing.

***Note**: The mini DIN PS/2 keyboard connector is optional.*



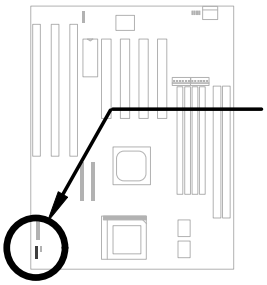
## 2.3.12 IrDA Connector

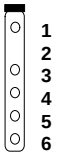
Serial port 2 can be configured to support wireless infrared module, with this module and application software such as Laplink, user can transfer files to or from laptops, notebooks, PDA and printers. This mainboard supports IrDA (115Kbps, 1 meter) as well as ASK-IR (19.2Kbps).

Install infrared module onto **IrDA** connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

| Pin | Description |
|---|---|
| 1 | +5V |
| 2 | NC |
| 3 | IRRX |
| 4 | GND |
| 5 | IRTX |
| 6 | +3.3V |

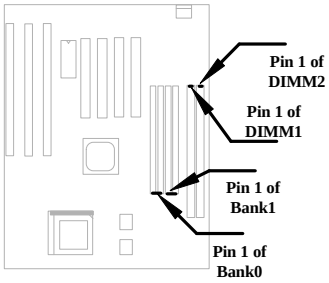
***Note**: Onboard serial port 2 (COM2) will not be available after IrDA connector is enabled.*






**IrDA**

## 2.4 Configuring the System Memory




This mainboard has four 72 pin SIMM sockets (Single-in-line Memory Module) and two 168 pin DIMM socket (Dual-in-line Memory Module).

The SIMM supported by this mainboard can be identified by 4 kinds of factors:

- Size: single side, 1Mx32 (4MB), 4Mx32 (16MB), 16Mx32 (64MB), and double side, 1Mx32x2 (8MB), 4Mx32x2 (32MB), 16Mx32x2 (128MB).
- Speed: 60ns or 70ns access time
- Type: FPM (Fast page mode) or EDO (Extended data output)
- Parity: without parity (32 bit wide) or with parity (36 bit wide).

The DIMM supported by this mainboard are always 64-bit wide SDRAM.

- Size: single side, 1Mx64 (8MB), 2Mx64 (16MB), 4Mx64 (32MB), 8Mx64 (64MB), 16Mx64 (128MB), and double side, 1Mx64x2 (16MB), 2Mx64x2 (32MB), 4Mx64x2 (64MB), 8Mx64x2 (128MB), 16Mx64x2 (256MB).
- Speed: normally marked -67, which means synchronous to maximum 67MHz.
- Parity: without parity (32 bit wide)

Because Pentium processor has 64 bit bus width, the four SIMM sockets are arranged in two banks of two sockets each, they are Bank0 and Bank1. Both SIMMs in each bank must be in the same size and type. It is allowed to have different speed and type in different bank, for example, 70ns FPM in one bank and 60ns EDO in another bank, in such case, each bank is independently optimized for maximum performance. The memory timing requires at least 70ns fast page mode DRAM chip, but for optimum performance, 60ns EDO DRAM is recommended.

***Warning**: The default memory timing setting is 60ns to obtain the optimal performance. Because of the specification limitation, 70ns SIMM is recommended to be used only for CPU external clock 60MHz.*

***Tip:** EDO DRAM is designed to improve the DRAM read performance. Unlike traditional fast page mode, that tri-states the memory output data to start the precharge activity, EDO DRAM holds the memory data valid until the next memory access cycle, which is similar to pipe-line effect and reduces one clock state.*

There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS. You can use any single side SIMM and DIMM combination list below for BANK0/BANK1 or DIMM socket, and the total memory size is to add them together. The SiS 5582 chipset can support up to 384MB.

| SIMM1 | SIMM2 | Subtotal of Bank0 |
|---|---|---|
| None | None | 0MB |
| 4MB | None | 4MB |
| 8MB | None | 8MB |
| 16MB | None | 16MB |
| 32MB | None | 32MB |
| 64MB | None | 64MB |
| 4MB | 4MB | 8MB |
| 8MB | 8MB | 16MB |
| 16MB | 16MB | 32MB |
| 32MB | 32MB | 64MB |
| 64MB | 64MB | 128MB |
| 128MB | 128MB | 256MB |

| SIMM3 | SIMM4 | Subtotal of Bank1 |
|---|---|---|
| None | None | 0MB |
| 4MB | 4MB | 8MB |
| 8MB | 8MB | 16MB |
| 16MB | 16MB | 32MB |
| 32MB | 32MB | 64MB |
| 64MB | 64MB | 128MB |
| 128MB | 128MB | 256MB |

| DIMM1 | Size of DIMM1 |
|---|---|
| None | 0MB |
| 8MB | 8MB |
| 16MB | 16MB |
| 32MB | 32MB |
| 64MB | 64MB |
| 128MB | 128MB |
| 256MB | 256MB |

| DIMM2 | Size of DIMM2 |
|---|---|
| None | 0MB |
| 8MB | 8MB |
| 16MB | 16MB |
| 32MB | 32MB |
| 64MB | 64MB |
| 128MB | 128MB |
| 256MB | 256MB |

**Total Memory Size = Subtotal of Bank0 + Subtotal of Bank1**
**+ Size of DIMM1 + Size of DIMM2**

***Caution:*** *Make sure that you install the same SIMM type and size for each bank.*

***Caution:*** *There are some old DIMMs made by EDO or FPM memory chip, they can only accept 5V power and probably can not fit into the DIMM socket, make sure you have 3.3V true SDRAM DIMM before your insert it.*

The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install SIMM. Unfortunately, there is no way that BIOS can identified the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only SIMM with chip count less than 24 chips.

***Warning**: Do not use SIMM and SDRAM DIMM together unless you have 5V tolerance SDRAM (such as Samsung or TI). The FPM/EDO operate at 5V while SDRAM operates at 3.3V. If you combine them together the system will temporary work fine; however after a few months, the SDRAM 3.3V data input will be damaged by 5V FPM/EDO data output line.*

There is an important parameter affects SDRAM performance, CAS Latency Time. It is similar as CAS Access Time of EDO DRAM and is calculated as number of clock state. The SDRAM that AOpen had tested are listed below. If your SDRAM has unstable problem, go into BIOS "Chipset Features Setup", change CAS Latency Time to 3 clocks.

| Manufacturer | Model | Suggested CAS Latency Time | 5V Tolerance |
|---|---|---|---|
| Samsung | KM416511220AT-G12 | 2 | Yes |
| NEC | D4S16162G5-A12-7JF | 2 | No |
| Hitachi | HM5216805TT10 | 2 | No |
| Fujitsu | 81117822A-100FN | 2 | No |
| TI | TMX626812DGE-12 | 2 | Yes |
| TI | TMS626812DGE-15 | 3 | Yes |
| TI | TMS626162DGE-15 | 3 | Yes |
| TI | TMS626162DGE-M67 | 3 | Yes |

***Warning**: Do not install any SIMM that contains more than 24 chips. SIMMs contain more than 24 chips exceed the chipset driving specification. Doing so may result in unstable system behavior.*

***Tip:** The SIMM/DIMM chip count can be calculated by following example:*

1. *For 32 bit non-parity SIMM using 1M by 4 bit DRAM chip, 32/4=8 chips.*
2. *For 36 bit parity SIMM using 1M by 4 bit DRAM chip, 36/4=9 chips.*
3. *For 36 bit parity SIMM using 1M by 4 bit and 1M by 1 bit DRAM, the chip count will be 8 data chips(8= 32/4) plus 4 parity chips(4=4/1), total is 12 chips.*
4. *For 64 bit DIMM using 1M by 16 bit SDRAM, the chip count is 64/16=4 chips.*

Following table list the recommended DRAM combinations of SIMM and DIMM:

| SIMM Data chip | SIMM Parity chip | Bit size per side | Single/ Double side | Chip count | SIMM size | Recommended |
|---|---|---|---|---|---|---|
| 1M by 4 | None | 1Mx32 | x1 | 8 | 4MB | Yes |
| 1M by 4 | None | 1Mx32 | x2 | 16 | 8MB | Yes |
| 1M by 4 | 1M by 1 | 1Mx36 | x1 | 12 | 4MB | Yes |
| 1M by 4 | 1M by 4 | 1Mx36 | x1 | 9 | 4MB | Yes |
| 1M by 4 | 1M by 4 | 1Mx36 | x2 | 18 | 8MB | Yes |
| 1M by 16 | None | 1Mx32 | x1 | 2 | 4MB | Yes |
| 1M by 16 | None | 1Mx32 | x2 | 4 | 8MB | Yes |
| 1M by 16 | 1M by 4 | 1Mx36 | x1 | 3 | 4MB | Yes |
| 1M by 16 | 1M by 4 | 1Mx36 | x2 | 6 | 8MB | Yes |
| 4M by 4 | None | 4Mx32 | x1 | 8 | 16MB | Yes |
| 4M by 4 | None | 4Mx32 | x2 | 16 | 32MB | Yes |
| 4M by 4 | 4M by 1 | 4Mx36 | x1 | 12 | 16MB | Yes |
| 4M by 4 | 4M by 1 | 4Mx36 | x2 | 24 | 32MB | Yes |

| SIMM Data chip | SIMM Parity chip | Bit size per side | Single/ Double side | Chip count | SIMM size | Recommended |
|---|---|---|---|---|---|---|
| 16M by 4 | None | 16Mx32 | x1 | 8 | 64MB | Yes, but not tested. |
| 16M by 4 | None | 16Mx32 | x2 | 16 | 128MB | Yes, but not tested. |
| 16M by 4 | 16M by 4 | 16Mx36 | x1 | 9 | 64MB | Yes, but not tested. |
| 16M by 4 | 16M by 4 | 16Mx36 | x2 | 18 | 128MB | Yes, but not tested. |

| DIMM Data chip | Bit size per side | Single/ Double side | Chip count | DIMM size | Recommended |
|---|---|---|---|---|---|
| 1M by 16 | 1Mx64 | x1 | 4 | 8MB | Yes |
| 1M by 16 | 1Mx64 | x2 | 8 | 16MB | Yes |
| 2M by 8 | 2Mx64 | x1 | 8 | 16MB | Yes |
| 2M by 8 | 2Mx64 | x2 | 16 | 32MB | Yes |

| DIMM Data chip | Bit size per side | Single/ Double side | Chip count | DIMM size | Recommended |
|---|---|---|---|---|---|
| 2M by 32 | 2Mx64 | x1 | 2 | 16MB | Yes, but not tested. |
| 2M by 32 | 2Mx64 | x2 | 4 | 32MB | Yes, but not tested. |
| 4M by 16 | 4Mx64 | x1 | 4 | 32MB | Yes, but not tested. |
| 4M by 16 | 4Mx64 | x2 | 8 | 64MB | Yes, but not tested. |
| 8M by 8 | 8Mx64 | x1 | 8 | 64MB | Yes, but not tested. |
| 8M by 8 | 8Mx64 | x2 | 16 | 128MB | Yes, but not tested. |

***Warning**: 64MB SIMMs using 16M by 4 bit chip (64M bit technology) are not available in the market and are not formally tested by AOpen quality test department yet. However they are supported by design specification and they will be tested as soon as they are available. Note that 64MB SIMMs using 16M by 1 bit chip (16M bit technology) have chip count exceed 24 and are strongly not recommended.*

***Tip:** 8 bit = 1 byte, 32 bit = 4 byte. The SIMM size is represented by number of data byte (whether with or without parity), for example, the size of single side SIMM*

*using 1M by 4 bit chip is 1Mx32 bit, that is, 1M x 4 byte= 4MB. For double side SIMM, simply multiply it by 2, that is, 8MB.*

Following table are possible DRAM combinations that is **NOT** recommended:

| SIMM Data chip | SIMM Parity chip | Bit size per side | Single/ Double side | Chip count | SIMM size | Recommended |
|---|---|---|---|---|---|---|
| 1M by 1 | None | 1Mx32 | x1 | 32 | 4MB | No |
| 1M by 1 | 1M by 1 | 1Mx36 | x1 | 36 | 4MB | No |
| 1M by 4 | 1M by 1 | 1Mx36 | x2 | 24 | 8MB | No |
| 4M by 1 | None | 4Mx32 | x1 | 32 | 16MB | No |
| 4M by 1 | 4M by 1 | 4Mx36 | x1 | 36 | 16MB | No |
| 16M by 1 | None | 16Mx32 | x1 | 32 | 64MB | No |
| 16M by 1 | 16M by 1 | 16Mx36 | x1 | 36 | 64MB | No |

| DIMM Data chip | Bit size per side | Single/ Double side | Chip count | DIMM size | Recommended |
|---|---|---|---|---|---|
| 4M by 4 | 4Mx64 | x1 | 16 | 32MB | No |
| 4M by 4 | 4Mx64 | x2 | 32 | 64MB | No |
| 16M by 4 | 16Mx64 | x1 | 16 | 128MB | No |
| 16M by 4 | 16Mx64 | x2 | 32 | 256MB | No |

Memory error checking is supported by parity check. To use parity check you need 36 bit SIMM (32 bit data + 4 bit parity), which are automatically detected by BIOS.

***Tip:*** *The parity mode uses 1 parity bit for each byte, normally it is even parity mode, that is, each time the memory data is updated, parity bit will be adjusted to have even count "1" for each byte. When next time, if memory is read with odd number of "1", the parity error is occurred and this is called single bit error detection.*

# Chapter 3

# Award BIOS

This chapter tells you how to configure the system parameters. You may update your BIOS via AWARD Flash Utility.

***Important:*** *Because the BIOS code is the most often changed part of the mainboard design, the BIOS information contained in this chapter (especially the Chipset Setup parameters) may be a little different compared to the actual BIOS that came with your mainboard. These changes are implemented to further enhance system performance.*

## 3.1 Entering the Award BIOS Setup Menu

The BIOS setup utility is a segment of codes/routines residing in the BIOS Flash ROM. This routine allows you to configure the system parameters and save the configuration into the 128 byte CMOS area, (normally in the RTC chip or directly in the main chipset). To enter the BIOS Setup, press DEL during POST (Power-On Self Test). The BIOS Setup Main Menu appears as follows.

```
ROM PCI/ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.
```

| | |
|---|---|
| STANDARD CMOS SETUP | INTEGRATED PERIPHRALS |
| BIOS FEATURES SETUP | PASSWORD SETTING |
| CHIPSET FEATURES SETUP | IDE HDD AUTO DETECTION |
| POWER MANAGEMENT SETUP | SAVE & EXIT SETUP |
| PNP/PCI CONFIGURATION SETUP | EXIT WITHOUT SAVING |
| LOAD SETUP DEFAULTS | |
| LOAD TURBO DEFAULTS | |
| ESC : Quit | á â à ß : Select Item |
| F10 : Save & Exit Setup | (Shift) F2 : Change Color |
| Description of each function | |

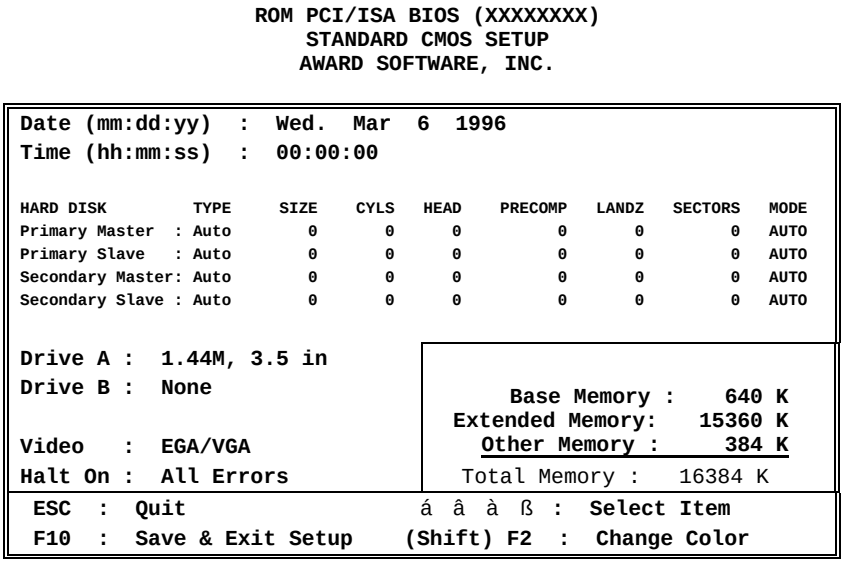
***Tip**: Choose "Load Setup Defaults" for recommended optimal performance. Choose "Load Turbo Defaults" for best performance with light system loading.*

The section at the bottom of the screen tells how to control the screen. Use the arrow keys to move between items, SHIFT F2 to color scheme of the display, ESC to exit, and F10 to save the changes before exit. Another section at the bottom of the screen displays a brief description of the highlighted item.

After selecting an item, press ENTER to select or enter a submenu.

## 3.2 Standard CMOS Setup

The "Standard CMOS Setup" sets the basic system parameters such as the date, time, and the hard disk type. Use the arrow keys to highlight an item and PGUP or PGDN to select the value for each item.




### Standard CMOS à Date

To set the date, highlight the Date parameter. Press PGUP or PGDN to set the current date. The date format is month, date, and year.

### Standard CMOS à Time

To set the time, highlight the Time parameter. Press PGUP or PGDN to set the current time in hour, minute, and second format. The time is based on the 24 hour military clock.

**Standard CMOS** à **Primary Master** à **Type**
**Standard CMOS** à **Primary Slave** à **Type**
**Standard CMOS** à **Secondary Master** à **Type**
**Standard CMOS** à **Secondary Slave** à **Type**

| **Type** |
|---|
| Auto |
| User |
| None |
| 1 |
| 2 |
| ... |
| 45 |

This item lets you select the IDE hard disk parameters that your system supports. These parameters are Size, Number of Cylinder, Number of Head, Start Cylinder for Pre-compensation, Cylinder number of Head Landing Zone and Number of Sector per Track. The default setting is **Auto,** which enables BIOS to automatically detect the parameters of installed HDD at POST (Power-On Self Test). If you prefer to enter HDD parameters manually, select User. Select None if no HDD is connected to the system.

The IDE CDROM is always automatically detected.

***Tip:*** *For an IDE hard disk, we recommend that you use the "IDE HDD Auto Detection" to enter the drive specifications automatically. See the section "IDE HDD Auto Detection".*

**Standard CMOS** à **Primary Master** à **Mode**
**Standard CMOS** à **Primary Slave** à **Mode**
**Standard CMOS** à **Secondary Master** à **Mode**
**Standard CMOS** à **Secondary Slave** à **Mode**

| **Mode** |
|---|
| Auto |
| Normal |
| LBA |
| Large |

The enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528MB. This is made possible through the Logical Block Address (LBA) mode translation. The LBA is now considered as a standard feature of current IDE hard disk on the market because of its capability to support capacity larger than 528MB. Note that if HDD is formatted with LBA On, it will not be able to boot with LBA Off.

**Standard CMOS** à **Drive A**
**Standard CMOS** à **Drive B**

| **Drive A** |
|---|
| None |
| 360KB 5.25" |
| 1.2MB 5.25" |
| 720KB 3.5" |
| 1.44MB 3.5" |
| 2.88MB 3.5" |

These items select floppy drive type. The available settings and types supported by the mainboard are listed on the left.

**Standard CMOS** à **Video**

| **Video** |
|---|
| EGA/VGA |
| CGA40 |
| CGA80 |
| Mono |

This item specifies the type of video card in use. The default setting is VGA/EGA. Since current PCs use VGA only, this function is almost useless and may be disregarded in the future.

**Standard CMOS** à **Halt On**

| **Halt On** |
|---|
| No Errors |
| All Errors |
| All, But Keyboard |
| All, But Diskette |
| All, But Disk/Key |

This parameter enables you to control the system stops in case of Power-On Self Test (POST) error.

## 3.3 BIOS Features Setup

This screen appears when you select the option "BIOS Features Setup" from the main menu.

```
ROM PCI/ISA BIOS (XXXXXXXX)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.
```

| | | | |
|---|---|---|---|
| Virus Warning | : Disabled | Video BIOS Shadow | : Enabled |
| External Cache | : Enabled | C8000-CBFFF Shadow | : Disabled |
| Quick Power On Self Test | : Enabled | CC000-CFFFF Shadow | : Disabled |
| Boot Sequence | : A,C,SCSI | D0000-D3FFF Shadow | : Disabled |
| Swap Floppy Drive | : Disabled | D4000-D7FFF Shadow | : Disabled |
| Boot Up Floppy Seek | : Disabled | D8000-DBFFF Shadow | : Disabled |
| Boot Up NumLock Status | : ON | DC000-DFFFF Shadow | : Disabled |
| Boot Up System Speed | : High | | |
| Typematic Rate Setting | : Disabled | | |
| Typematic Rate (Chars/Sec) | : 6 | | |
| Typematic Delay (Msec) | : 250 | ESC: Quit | á â à ß : Select Item |
| Security Option | : Setup | F1 : Help | PU/PD/+/- : Modify |
| PCI/VGA Palette Snoop | : Disabled | F5 : Old Values | (Shift) F2 : Color |
| OS Select for DRAM > 64MB | : Non-OS/2 | F6 : Load Setup Defaults | |
| | | F7 : Load Turbo Defaults | |

### BIOS Features à Virus Warning

| **Virus Warning** |
|---|
| Enabled |
| Disabled |

Set this parameter to Enabled to activate the warning message. This feature protects the boot sector and partition table of your hard disk from virus intrusion.

Any attempt during boot up to write to the boot sector of the hard disk drive stops the system and the following warning message appears on the screen. Run an anti-virus program to locate the problem.

```
! WARNING !
Disk Boot Sector is to be modified
Type "Y" to accept write, or "N" to abort write
Award Software, Inc.
```

### BIOS Features à External Cache

| **External Cache** |
|---|
| Enabled |
| Disabled |

Enabling this parameter activates the secondary cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

### BIOS Features à Power-On Self-Test

| **Quick Power-on Self-test** |
|---|
| Enable |
| Disabled |

This parameter speeds up POST by skipping some items that are normally checked.

### BIOS Features à Boot Sequence

| **Boot Sequence** |
|---|
| A,C,SCSI |
| C,A,SCSI |
| C,CDROM,A |
| CDROM,C,A |
| D,A,SCSI |
| E,A,SCSI |
| F,A,SCSI |
| SCSI,A,C |
| SCSI,C,A |
| C only |
| LS120,C |

This parameter allows you to specify the system boot up search sequence. The hard disk ID are listed below:

C: Primary master

D: Primary slave

E: Secondary master

F: Secondary slave

### BIOS Features à Swap Floppy Drive

| **Swap Floppy Drive** |
|---|
| Enabled |
| Disabled |

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.

### BIOS Features à Boot-up Floppy Seek

| **Boot-up Floppy Seek** |
|---|
| Enabled |
| Disabled |

When enabled, the BIOS issues the seek command to the floppy drive during POST to move floppy drive head forward and backward.

### BIOS Features à Boot-up NumLock Status

| **Boot-up NumLock Status** |
|---|
| On |
| Off |

Setting this parameter to On enables the numeric function of the numeric keypad. Set this parameter to Off to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control.

### BIOS Features à Boot-up System Speed

| **Boot-up System Speed** |
|---|
| High |
| Low |

Select High or Low system speed after boot.

### BIOS Features à Typematic Rate Setting

| **Typematic Rate Setting** |
|---|
| Enabled |
| Disabled |

Set this parameter to Enable/Disable the keyboard repeat function. When enabled, continually holding down a key on the keyboard will generate repeatedly keystrokes.

### BIOS Features à Typematic Rate

| Typematic Rate |
|---|
| 6 |
| 8 |
| 10 |
| 12 |
| 15 |
| 20 |
| 24 |
| 30 |

This item allows you to control the speed of repeated keystrokes. The default is `30 characters/sec`.

### BIOS Features à Typematic Delay

| Typematic Delay |
|---|
| 250 |
| 500 |
| 750 |
| 1000 |

This parameter allows you to control the delay time between the first and the second keystroke (where the repeated keystrokes begin). The typematic delay settings are 250, 500, 750, and 1000 msec.

### BIOS Features à Security Option

| Security Option |
|---|
| Setup |
| System |

The **System** option limits access to both the System boot and BIOS setup. A prompt asking you to enter your password appears on the screen every time you boot the system.

The **Setup** option limits access only to BIOS setup.

To disable the security option, select Password Setting from the main menu, don't type anything and just press <Enter>.

### BIOS Features à PCI/VGA Palette Snoop

| **PCI/VGA Palette Snoop** |
|---|
| Enabled |
| Disabled |

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

### BIOS Features à OS Select for DRAM > 64MB

| **OS Select for DRAM > 64MB** |
|---|
| OS/2 |
| Non-OS/2 |

Set to OS/2 if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

### BIOS Features à Video BIOS Shadow

| **Video BIOS Shadow** |
|---|
| Enabled |
| Disabled |

VGA BIOS Shadowing means to copy video display card BIOS into the DRAM area. This enhances system performance because DRAM access time is faster than ROM.

### BIOS Features à C800-CBFF Shadow
### BIOS Features à CC00-CFFF Shadow
### BIOS Features à D000-D3FF Shadow
### BIOS Features à D400-D7FF Shadow
### BIOS Features à D800-DBFF Shadow
### BIOS Features à DC00-DFFF Shadow

| **C8000-CBFFF Shadow** |
|---|
| Enabled |
| Disabled |

These six items are for shadowing ROM code on other expansion cards. Before you set these parameters, you need to know the specific addresses of that ROM code. If you do not know this information, enable all the ROM shadow settings. Note that the F000 and E000 segments are always shadowed because BIOS code occupies these areas.

## 3.4 Chipset Features Setup

The "Chipset Features Setup" includes settings for the chipset dependent features. These features are related to system performance.

```
ROM PCI/ISA BIOS (XXXXXXXX)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.
```

| | | | |
|---|---|---|---|
| Auto Configuration | : Disabled | CPU to PCI Post Write | : Disabled |
| | | CPU to PCI Burst Mem. WR | : Disabled |
| L2(WB) Tag Bit Length | : 8bits | ISA Bus Clock Frequency | : PCICLK/4 |
| NA# delay on Burst Read | : Enabled | System BIOS Cacheable | : Disabled |
| NA# Enable | : Enabled | Video BIOS Cacheable | : Disabled |
| Starting Point of Paging | : 1T | Memory Hole At 15M-16M | : Disabled |
| Refresh Cycle time (us) | : 62.4 | | |
| RAS Pulse Width (Refresh) | : 5T | | |
| RAS Precharge Time | : 5T | | |
| RAS to CAS Delay | : 3T | | |
| CAS# Pulse Width(FP) | : 2T | | |
| CAS# Pulse Width(EDO) | : 1T | | |
| RAMW# Assertion Timing | : 3T | | |
| CAS Precharge Time(FP) | : 2T | | |
| CAS Precharge Time(EDO) | : 1T/2T | | |
| SDRAM CAS Latency | : 3T | ESC: Quit á â à ß : Select Item | |
| SDRAM WR Retire Rate | : X-1-1-1 | F1 : Help PU/PD/+/- : Modify | |
| SDRAM Wait State Control | : 1WS | F5 : Old Values (Shift) F2 : Color | |
| Enhanced Memory Write | : Disabled | F6 : Load Setup Defaults | |
| Read Prefetch Memory RD | : Disabled | F7 : Load Turbo Defaults | |

***Caution:*** *Make sure you fully understand the items contained in this menu before you try to change anything. You may change the parameter settings to improve system performance . However, it may cause system unstable if the setting are not correct for your system configuration.*

### Chipset Features à Auto Configuration

| **Auto Configuration** |
|---|
| Enabled |
| Disabled |

When **Enabled**, the DRAM and cache related timing are set to pre-defined value according to CPU type and clock. Select **Disable** if you want to specify your own DRAM timing.

### Chipset Features à L2 (WB) Tag Bit Length

| L2 (WB) Tag Bit Length |
|---|
| 7bits |
| 8bits |

This item lets you control the L2 Cache Tag Size. Please note that if you choose 8 bit, the Enhanced Memory Write function must be disabled.

### Chipset Features à NA# delay on Burst Read

| NA# delay on Burst Read |
|---|
| Enabled |
| Disabled |

This item lets you control the NA# Delay 1T on Burst read hit L2 Cache Cycle.

### Chipset Features à NA# Enable

| NA# Enable |
|---|
| Enabled |
| Disabled |

This item lets you control the NA# assertion. NA# means assertion next address, it is used on piple lined operation to improve system performance.

### Chipset Features à Starting Point of Paging

| Starting Point of Paging |
|---|
| 1T |
| 2T |
| 4T |
| 8T |

This parameter specifies the number of clocks required for starting of page miss cycles.

### Chipset Features à Refresh Cycle Time (us)

| Refresh Cycle Time (us) |
|---|
| 15.6 |
| 62.4 |
| 124.8 |
| 187.2 |

This option lets you set the cycle time for the chipset to refresh DRAM to avoid losing data. The unit is micro second (us).

### Chipset Features à RAS Pulse Width Refresh

| **RAS Pulse Width Refresh** |
|---|
| 4T |
| 5T |
| 6T |
| 7T |

This parameter specifies the number of clocks required to assert the DRAM row address strobe (RAS) signal for refresh cycles.

### Chipset Features à RAS Precharge Time

| **RAS Precharge Time** |
|---|
| 2T |
| 3T |
| 4T |
| 5T |

This parameter specifies the number of clocks required to deassert the RAS signal to prevent DRAM from losing data after performing a read. This operation is called Precharge.

### Chipset Features à RAS to CAS Delay

| **RAS to CAS Delay** |
|---|
| 2T |
| 3T |
| 4T |
| 5T |

This option allows you to set the wait state between row address strobe (RAS) and column address strobe (CAS) signals.

### Chipset Features à CAS# Pulse Width (FP)

| **CAS# Pulse Width (FP)** |
|---|
| 1T |
| 2T |

This parameter specifies the number of clocks required to assert the CAS pulse width for fast page mode DRAM.

### Chipset Features à CAS# Pulse Width (EDO)

| **CAS# Pulse Width (EDO)** |
|---|
| 1T |
| 2T |

This parameter specifies the number of clocks required to assert the CAS pulse width for EDO DRAM.

**Chipset Features** à **RAMW# Assertion Timing**

| **RAMW# Assertion Timing** |
|---|
| 2T |
| 3T |

This parameter specifies the number of clocks required to assert the DRAM write control signal when read cycle followed by write cycle.

**Chipset Features** à **CAS Precharge Time (FP)**

| **CAS Precharge Time (FP)** |
|---|
| 1T |
| 2T |
| 1T/2T |

CAS Precharge Time for FPM DRAM.

(For 1T/2T option,
1T: during burst cycles.
2T: for different cycles.)

**Chipset Features** à **CAS Precharge Time (EDO)**

| **CAS Precharge Time (EDO)** |
|---|
| 1T |
| 2T |
| 1T/2T |

CAS Precharge Time for EDO DRAM.

(For 1T/2T option,
1T: during burst cycles.
2T: for different cycles.)

**Chipset Features** à **SDRAM CAS Latency**

| **SDRAM CAS Latency** |
|---|
| 2T |
| 3T |

This parameter speifies the number of clocks of SDRAM CAS Lateny. This is very important parameter affects SDRAM performance. If your SDRAM has unstable problem, set to 3T.

**Chipset Features** à **SDRAM WR Retire Rate**

| **SDRAM WR Retire Rate** |
|---|
| X-1-1-1 |
| X-2-2-2 |

This parameter specifies the number of clocks required to assert the SDRAM Write Retire Rate.

### Chipset Features à SDRAM Wait State Control

| **SDRAM Wait State Control** |
|---|
| 0WS |
| 1WS |

This parameter specifies the number of clocks of SDRAM Wait State Control during Precharge.

0WS: zero wait state.
1WS: one wait state.

### Chipset Features à Enhanced Memory Write

| **Enhanced Memory Write** |
|---|
| Enabled |
| Disabled |

This item lets you control the Enhanced Performance for the memory write and Invalidate of PCI bus command. If the L2 (WB) Tag Bit Length is set to 7bit, you can enable this function to get better system performance.

### Chipset Features à Read Prefetch Memory RD

| **Read Prefetch Memory RD** |
|---|
| Enabled |
| Disabled |

This item lets you control the Read Prefetch of the memory read of PCI bus command. When enabled, Memory Read Multiple and Memory Read Line of PCI commands always do prefeth.

### Chipset Features à CPU to PCI Post Write

| **CPU to PCI Post Write** |
|---|
| 3T |
| 4T |
| Disabled |

This parameter specifies the number of clocks for CPU to PCI Post Write cycle.

### Chipset Features à CPU to PCI Burst Mem. WR

| **CPU to PCI Burst Mem. WR** |
| --- |
| Enabled |
| Disabled |

This item lets you control the CPU to PCI Burst Memory Write.

### Chipset Features à ISA Bus Clock Frequency

| **ISA Bus Clock Frequency** |
| --- |
| PCICLK/3 |
| PCICLK/4 |
| 7.159MHz |

This item lets you select the ISA bus clock. Normally, the PCI bus clock is the CPU bus (external) clock divided by 2, PCICLK=CPUCLK/2. For example, CPUCLK=66MHz, PCICLK=66/2=33MHz, ISA bus CLK=33/4=8.25MHz.

### Chipset Features à System BIOS Cacheable

| | |
|---|---|
| **System BIOS Cacheable**<br>Enabled<br>Disabled | Enabling this item allows you to cache the system BIOS to further enhance system performance. |

### Chipset Features à Video BIOS Cacheable

| | |
|---|---|
| **Video BIOS Cacheable**<br>Enabled<br>Disabled | Allows the video BIOS to be cached to allow faster video performance. |

### Chipset Features à Memory Hole At 15M-16M

| | |
|---|---|
| **Memory Hole At 15M-16M**<br>Enabled<br>Disabled | This option lets you reserve system memory area for special ISA cards. The chipset accesses code/data of these areas from the ISA bus directly. Normally, these areas are reserved for memory mapped I/O card. |

## 3.5 Power Management Setup

The Power Management Setup screen enables you to control the mainboard's green features. See the following screen.

```
                ROM PCI/ISA BIOS (XXXXXXXX)
                POWER MANAGEMENT SETUP
                AWARD SOFTWARE, INC.

Power Management      : User Define          IRQ3  (COM2)        :  Enabled
PM Control by APM     : Yes                  IRQ4  (COM1)        :  Enabled
Video Off Option      : Susp,Stdby->Off      IRQ5  (LPT2)        :  Enabled
Video Off Method      : V/H SYNC+Blank       IRQ6  (Floppy Disk):  Enabled
Doze Speed (div by)   : 2                    IRQ7  (LPT1)        :  Enabled
Stdby Speed (div by)  : 3                    IRQ8  (RTC Alarm)   :  Disabled
Suspend Mode Option   : Power On Suspend     IRQ9  (IRQ2 Redir)  :  Enabled
Modem Use IRQ         : 3                    IRQ10 (Reserved)    :  Enabled
                                             IRQ11 (Reserved)    :  Enabled
     **PM Timers**                           IRQ12 (PS/2 Mouse)  :  Enabled
Doze Mode             : Disabled             IRQ13 (Coprocessor):  Enabled
Standby Mode          : Disabled             IRQ14 (Hard Disk)   :  Enabled
Suspend Mode          : Disabled             IRQ15 (Reserved)    :  Enabled
HDD Power Down        : Disabled

     **PM Events**                           ESC: Quit       á â à ß    : Select Item
COM Ports Activity    : Enabled              F1 : Help       PU/PD/+/- : Modify
LPT Port Activity     : Enabled              F5 : Old Values    (Shift) F2 : Color
HDD Port Activity     : Enabled              F6 : Load TURBO Defaults
VGA Activity          : Disabled             F7 : Load Setup Defaults
```

### Power Management à Power Management

| **Power Management** |
|---|
| Max Saving |
| Mix Saving |
| User Defined |
| Disabled |

This function allows you to set the default parameters of power-saving modes. Set to **Disable** to turn off power management function. Set to User Defined to choose your own parameters.

| Mode | Doze | Standby | Suspend |
|---|---|---|---|
| Min Saving | 40 min | 40 min | 40 min |
| Max Saving | 20 sec | 20 sec | 20 sec |

### Power Management à PM Controlled by APM

| PM Controlled by APM |
|---|
| Yes |
| No |

If "Max Saving" is selected, you can turn on this item, transfer power management control to APM (Advanced Power Management) and enhance power saving function. For example, stop CPU internal clock.

### Power Management à Video Off Option

| Video Off Option |
|---|
| Always On |
| All Modes → Off |
| Suspend → Off |
| Susp, Standby → Off |

To turn off video monitor at which power down mode.

### Power Management à Video Off Method

| Video Off Method |
|---|
| Blank Screen |
| V/H SYNC+Blank |
| DPMS |

This determines the way that monitor is off. Blank Screen writes blanks to video buffer. V/H SYNC+Blank allows BIOS to control VSYNC and HSYNC signals. This function applies only for DPMS (Display Power Management Standard) monitor. The DPMS mode uses DPMS function provided by VGA card.

### Power Management à Doze Speed (div by)
### Power Management à Stdby Speed (div by)

| Doze Speed (div by) |
|---|
| 1 |
| 2 |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 8 |

These items let you set the system speed divisor to specify the rate at which the system speed will slow down once it enters the **Doze Mode** or **Standby Mode**. The options are from 1 to 8. To determine the exact rate of the system in Doze mode, take 2 as the divisor and 133MHz as the normal system speed. 133MHz/2 = 66MHz - this is the system speed in Doze mode.

### Power Management à Suspend Mode Option

| **Suspend Mode Option** |
| --- |
| Power On Suspend |
| Suspend to Hard Drive |

You can select suspend mode by this item. **Power On Suspend** is the traditional Green PC suspend mode, the CPU clock is stop, all other devices are shut off. But power must be kept On to detect activities from modem, keyboard/mouse and returns the system to full power. The system activities is detected by monitoring the IRQ signals. **Suspend to Hard Drive** saves system status, memory and screen image into hard disk, then the power can be totally Off. Next time, when power is turned On, the system goes back to your original work within just few seconds. You need utility ZVHDD to reserve disk space. Refer to section "Suspend to Hard Drive" for more information".

### Power Management à Modem Use IRQ

| **Modem Use IRQ** |
| --- |
| NA |
| 3 |
| 4 |
| 5 |
| 6 |
| 7 |
| 9 |
| 10 |
| 11 |

This item tells BIOS/Chipset the IRQ of your modem. This allows BIOS/Chipset to monitor the activities of the modem connected to your system.

### Power Management à Doze Mode

| **Doze Mode** |
|---|
| Disabled |
| 20 Sec |
| 1 Min |
| 5 Min |
| 10 Min |
| 15 Min |
| 20 Min |
| 30 Min |
| 40 Min |

This item lets you set the period of time after which the system enters into Doze mode. In this mode, the CPU clock slows down. The ratio is specified in the "Throttle Duty Cycle". Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

### Power Management à Standby Mode

| **Standby Mode** |
|---|
| Disabled |
| 20 Sec |
| 1 Min |
| 5 Min |
| 10 Min |
| 15 Min |
| 20 Min |
| 30 Min |
| 40 Min |

This item lets you set the period of time after which the system enters into Standby mode. In this mode, CPU clock slows down, hard disk will be shut off and the monitor power-saving feature activates. Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

### Power Management à Suspend Mode

| **Suspend Mode** |
|---|
| Disabled |
| 20 Sec |
| 1 Min |
| 5 Min |
| 10 Min |
| 15 Min |
| 20 Min |
| 30 Min |
| 40 Min |

This item lets you set the period of time after which the system enters into Suspend mode. In this mode, CPU clock stops, all other devices will be shut off. Any activity detected returns the system to full power. The system activity(or event) is detected by monitoring the IRQ signals.

**Power Management** à **HDD Power Down**

| **HDD Power Down** |
|---|
| Disabled |
| 1 Min |
| ..... |
| 15 Min |

This option lets you specify the IDE HDD idle time before the device enters the power down state. This item is independent from the power states described in this section (Standby and Suspend).

**Power Management** à **COM Ports Activity**
**Power Management** à **LPT Ports Activity**
**Power Management** à **HDD Ports Activity**
**Power Management** à **VGA Activity**

| **COM Ports Activity** |
|---|
| Enabled |
| Disabled |

To enable or disable the detection of COM port, LPT, HDD, VGA activities for power down state transition.

**Power Management** à **IRQ3 (COM2)**
**Power Management** à **IRQ4 (COM1)**
**Power Management** à **IRQ5 (LPT2)**
**Power Management** à **IRQ6 (Floppy Disk)**
**Power Management** à **IRQ8 (RTC Alarm)**
**Power Management** à **IRQ9 (IRQ2 Redir)**
**Power Management** à **IRQ10 (Reserved)**
**Power Management** à **IRQ11 (Reserved)**
**Power Management** à **IRQ12 (PS/2 Mouse)**
**Power Management** à **IRQ13 (Coprocessor)**
**Power Management** à **IRQ14 (Hard Disk)**
**Power Management** à **IRQ15 (Reserved)**

| **IRQ2 (COM2)** |
|---|
| Enabled |
| Disabled |

To enable or disable the detection of IRQ event for power down state transition. Note that OS2 has periodically IRQ8 (RTC) interruptions, If IRQ8 is not set to **Disabled**, OS/2 may fail to go into Doze/Standby/Suspend mode.

## 3.6 PNP/PCI Configuration Setup

The PNP/PCI Configuration Setup allows you to configure the ISA and PCI devices installed in your system. The following screen appears if you select the option "PNP/PCI Configuration Setup" from the main menu.

```
ROM PCI/ISA BIOS (XXXXXXXX)
PNP/PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.
```

| | | | |
|---|---|---|---|
| PNP OS Installed | : No | PCI IDE IRQ Map To | : PCI-Auto |
| Resources Controlled By | : Manual | Primary IDE INT# | : A |
| Reset Configuration Data | : Disabled | Secondary IDE INT# | : B |
| IRQ 3 assigned to | : PCI/ISA PnP | | |
| IRQ 4 assigned to | : PCI/ISA PnP | Used MEM base addr | : N/A |
| IRQ 5 assigned to | : PCI/ISA PnP | Used MEM Length | : 8K |
| IRQ 7 assigned to | : PCI/ISA PnP | | |
| IRQ 9 assigned to | : PCI/ISA PnP | | |
| IRQ 10 assigned to | : PCI/ISA PnP | | |
| IRQ 11 assigned to | : PCI/ISA PnP | | |
| IRQ 12 assigned to | : PCI/ISA PnP | | |
| IRQ 14 assigned to | : PCI/ISA PnP | | |
| IRQ 15 assigned to | : PCI/ISA PnP | | |
| DMA 0 assigned to | : PCI/ISA PnP | ESC: Quit | á â à ß : Select Item |
| DMA 1 assigned to | : PCI/ISA PnP | F1 : Help | PU/PD/+/- : Modify |
| DMA 3 assigned to | : PCI/ISA PnP | F5 : Old Values | (Shift) F2 : Color |
| DMA 5 assigned to | : PCI/ISA PnP | F6 : Load Setup Defaults | |
| DMA 6 assigned to | : PCI/ISA PnP | F7 : Load Turbo Defaults | |
| DMA 7 assigned to | : PCI/ISA PnP | | |

### PNP/PCI Configuration à PnP OS Installed

| PnP OS Installed |
|---|
| Yes |
| No |

Normally, the PnP resources are allocated by BIOS during POST (Power-On Self Test). If you are using a PnP operating system (such as Windows 95), set this item to Yes to inform BIOS to configure only the resources needed for booting (VGA/IDE or SCSI). The rest of system resources will be allocated by PnP operating system.

**PNP/PCI Configuration** à **Resources Controlled By**

| **Resources Controlled by** |
|---|
| Auto |
| Manual |

Setting this option to Manual allows you to individually assign the IRQs and DMAs to the ISA and PCI devices. Set this to **Auto** to enable the auto-configuration function.

**PNP/PCI Configuration** à **Reset Configuration Data**

| **Reset Configuration Data** |
|---|
| Enabled |
| Disabled |

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs.

**PNP/PCI Configuration** à **IRQ3** (COM2) **assigned to**
**PNP/PCI Configuration** à **IRQ4** (COM1) **assigned to**
**PNP/PCI Configuration** à **IRQ5** (Network/Sound) **assigned to**
**PNP/PCI Configuration** à **IRQ7** (Printer or Others) **assigned to**
**PNP/PCI Configuration** à **IRQ9** (Video or Others) **assigned to**
**PNP/PCI Configuration** à **IRQ10** (SCSI or Others) **assigned to**
**PNP/PCI Configuration** à **IRQ11** (SCSI or Others) **assigned to**
**PNP/PCI Configuration** à **IRQ12** (PS/2 Mouse) **assigned to**
**PNP/PCI Configuration** à **IRQ14** (IDE1) **assigned to**
**PNP/PCI Configuration** à **IRQ15** (IDE2) **assigned to**

| **IRQ 3 assigned to** |
|---|
| Legacy ISA |
| PCI/ISA PnP |

If your ISA card is not PnP compatible and requires a special IRQ to support its function, set the selected IRQ to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI cards are always PnP compatible (except old PCI IDE card).

**PNP/PCI Configuration** à **DMA 0 assigned to**
**PNP/PCI Configuration** à **DMA 1 assigned to**
**PNP/PCI Configuration** à **DMA 3 assigned to**
**PNP/PCI Configuration** à **DMA 5 assigned to**
**PNP/PCI Configuration** à **DMA 6 assigned to**
**PNP/PCI Configuration** à **DMA 7 assigned to**

| **DMA 0 assigned to** |
|---|
| Legacy ISA |
| PCI/ISA PnP |

If your ISA card is not PnP compatible and requires a special DMA channel to support its function, set the selected DMA channel to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected DMA channel for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI card does not require DMA channel.

**PNP/PCI Configuration** à **PCI IDE IRQ Map To**

| **PCI IDE IRQ Map To** |
|---|
| ISA |
| PCI-Slot1 |
| PCI-Slot2 |
| PCI-Slot3 |
| PCI-Slot4 |
| PCI-Auto |

Some old PCI IDE add-on cards are not fully PnP compatible. These cards require you to specify the slot in use to enable BIOS to properly configure the PnP resources. This function allows you to select the PCI slot for any PCI IDE add-on card present in your system. Set this item to **Auto** to allow BIOS to automatically configure the installed PCI IDE card(s).

**PNP/PCI Configuration** à **Primary IDE INT#**
**PNP/PCI Configuration** à **Secondary IDE INT#**

| **Primary IDE INT#** |
|---|
| A |
| B |
| C |
| D |

These two items, in conjunction with item "PCI IDE IRQ Map To", specify the IRQ routing of the primary or secondary channel of the PCI IDE add-on card (not the onboard IDE). Each PCI slot has four PCI interrupts aligned as listed in the table below. You must specify the slot in the "PCI IDE IRQ Map To", and set the PCI interrupt (INTx) here according to the interrupt connection on the card.

| PCI Slot | Location 1 | Location 2 | Location 3 | Location 4 |
|---|---|---|---|---|

| | (pin A6) | (pin B7) | (pin A7) | (pin B8) |
|---|---|---|---|---|
| Slot 1 | INTA | INTB | INTC | INTD |
| Slot 2 | INTB | INTC | INTD | INTA |
| Slot 3 | INTC | INTD | INTA | INTB |
| Slot 4 | INTD | INTA | INTB | INTC |
| Slot 5 (if any) | INTD | INTA | INTB | INTC |

### PNP/PCI Configuration à Used MEM Base Addr

| Used MEM base addr |
|---|
| N/A |
| C800 |
| CC00 |
| D000 |
| D400 |
| D800 |
| DC00 |

This item, in conjunction with the "Used MEM Length", lets you set a memory space for non-PnP compatible ISA card. This item specifies the memory base (start address) of the reserved memory space. The memory size is specified in the "Used MEM Length" **.**

### PNP/PCI Configuration à Used MEM Length

| Used MEM Length |
|---|
| 8K |
| 16K |
| 32K |
| 64K |

If your ISA card is not PnP compatible and requires special memory space to support its function, specify the memory size in this parameter to inform the PnP BIOS to reserve the specified memory space for installed legacy ISA card.

## 3.7 Load Setup Defaults

The "Load Setup Defaults" option loads optimized settings for optimum system performance. Optimal settings are relatively safer than the Turbo settings. We recommend you to use the Optimal settings if your system has large memory size and fully loaded with add-on card (for example, a file server using double-sided 8MB SIMM x4 and SCSI plus Network card occupying the PCI and ISA slots).

Optimal is not the slowest setting for this mainboard. If you need to verify a unstable problem, you may manually set the parameter in the "BIOS Features Setup" and "Chipset Features Setup" to get slowest and safer setting.

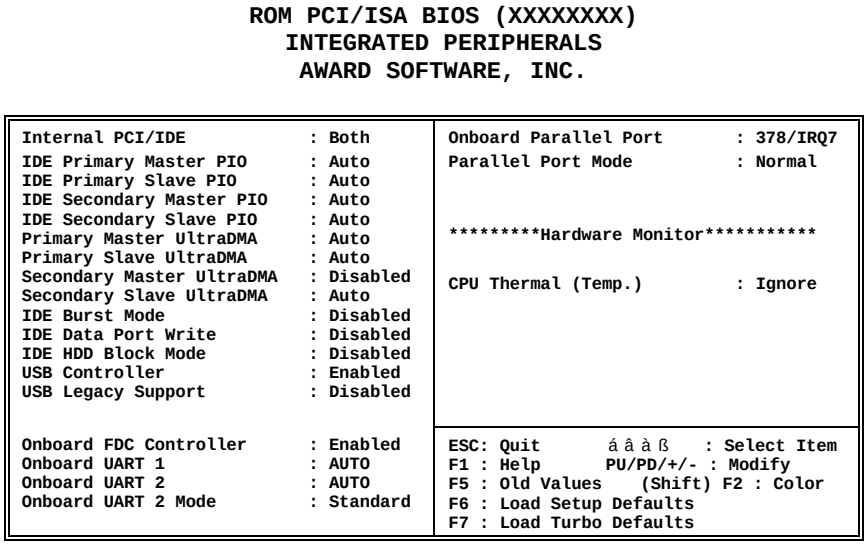
## 3.8 Load Turbo Defaults

The "Load Turbo Defaults" option gives better performance than Optimal values. However, Turbo values may not be the best setting of this mainboard but these values are qualified by the AOpen RD and QA department as the reliable settings especially if you have limited loading of add-on card and memory size (for example, a system that contains only a VGA/Sound card and two SIMMs).

To attain the best system performance, you may manually set the parameters in the "Chipset Features Setup" to get proprietary setting. Make sure that you know and understand the functions of every item in Chipset Setup menu. The performance difference of Turbo from Optimal is normally around 3% to 10%, depending on the chipset and the application.

## 3.9 Integrated Peripherals

The following screen appears if you select the option "Integrated Peripherals" from the main menu. This option allows you to configure the I/O features.




**Integrated Peripherals** à **Internal PCI/IDE**

| **Internal PCI IDE** |
|---|
| Disabled |
| Primary |
| Secondary |
| Both |

This parameter lets you enable or disable the on-chip primary or secondary IDE device.

**Integrated Peripherals** à **IDE Primary Master PIO**
**Integrated Peripherals** à **IDE Primary Slave PIO**
**Integrated Peripherals** à **IDE Secondary Master PIO**
**Integrated Peripherals** à **IDE Secondary Slave PIO**

| **IDE Primary Master PIO** |
|---|
| Auto |
| Mode 0 |
| Mode 1 |
| Mode 2 |
| Mode 3 |
| Mode 4 |

Setting this item to **Auto** activates the HDD speed auto-detect function. The PIO mode specifies the data transfer rate of HDD. For example: mode 0 data transfer rate is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. If your hard disk performance becomes unstable, you may manually try the slower mode.

***Caution:*** *It is recommended that you connect the first IDE device of each channel to the endmost connector of the IDE cable. Refer to section 2.3 "Connectors" for details on how to connect IDE device(s).*

**Integrated Peripherals** à **IDE Primary Master UDMA**
**Integrated Peripherals** à **IDE Primary Slave UDMA**
**Integrated Peripherals** à **IDE Secondary Master UDMA**
**Integrated Peripherals** à **IDE Secondary Slave UDMA**

| **IDE Primary Master UDMA** |
|---|
| Auto |
| Disabled |

This item allows you to set the Ultra DMA/33 mode supported by the hard disk drive connected to your primary IDE connector.

**Integrated Peripherals** à **IDE Burst Mode**

| **IDE Burst Mode** |
|---|
| Enabled |
| Disabled |

This item lets you control the bottom address of the ISA address hole.

### Integrated Peripherals à IDE Data Port Post Write

| **IDE Data Port Post Write** |
|---|
| Enabled |
| Disabled |

This item lets you control the IDE Data Port Write function.

### Integrated Peripherals à IDE HDD Block Mode

| **IDE HDD Block Mode** |
|---|
| Enabled |
| Disabled |

This feature enhances disk performance by allowing multisector data transfers and eliminates the interrupt handling time for each sector. Most IDE drives, except with old designs, can support this feature.

### Integrated Peripherals à USB Controller

| **USB Controller** |
|---|
| Enabled |
| Disabled |

USB device is default to use PCI INTD#, the same as PCI slot4. If you installed PCI card on slot4 and require to use INTD#, set this item to Disabled. The USB device will then be disabled.

***Note:****Normally, PCI VGA does not need PCI interrupt, you may put PCI VGA on slot4.*

### Integrated Peripherals à USB Legacy Support

| **USB Legacy Support** |
|---|
| Enabled |
| Disabled |

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.

***Caution****: You can not use both USB driver and USB legacy keyboard at the same time. Disable "USB Legacy Support" if you have USB driver in the operating system.*

### Integrated Peripherals à Onboard FDC Controller

| **Onboard FDC Controller** |
|---|
| Enabled |
| Disabled |

Setting this parameter to **Enabled** allows you to connect your floppy disk drives to the onboard floppy disk connector instead of a separate controller card. Change the setting to Disabled if you want to use a separate controller card.

### Integrated Peripherals à Onboard UART 1
### Integrated Peripherals à Onboard UART 2

| **Onboard UART 1** |
|---|
| Auto |
| 3F8/IRQ4 |
| 2F8/IRQ3 |
| 3E8/IRQ4 |
| 2E8/IRQ3 |
| Disabled |

This item allow you to assign address and interrupt for the board serial port. Default is **Auto**.

***Note:*** *If you are using an network card, make sure that the interrupt does not conflict.*

### Integrated Peripherals à Onboard UART 2 Mode

| **Onboard UART 2 Mode** |
|---|
| Standard |
| HPSIR |
| ASKIR |

This item is configurable only if the "Onboard UART 2" is enabled. This allows you to specify the mode of serial port2. The available mode selections are:

- **Standard -** Sets serial port 2 to operate in normal mode. This is the default setting.
- **HPSIR -** Select this setting if you installed an Infrared module in your system via IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 115K baud.

- **ASKIR -** Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 19.2K baud.

### Integrated Peripherals à IR Duplex Mode

| **IR Duplex Mode** |
|---|
| Full |
| Half |

This item lets you set the duplex mode for the IR communication. Full - Allows IR communication in bidirectional mode. Half - Allows IR communication in single direction only.

***Note:*** *This option appears only if the IR function is activated and the Onboard UART 2 Mode parameter is NOT set to* Standard*.*

### Integrated Peripherals à Onboard Parallel Port

| **Onboard Parallel Port** |
|---|
| 3BC/IRQ7 |
| 378/IRQ7 |
| 278/IRQ7 |
| Disabled |

This item controls the onboard parallel port address and interrupt.

***Note:*** *If you are using an I/O card with a parallel port, make sure that the addresses and IRQ do not conflict.*

### Integrated Peripherals à Parallel Port Mode

| **Parallel Port Mode** |
|---|
| Normal |
| EPP |
| ECP |
| ECP + EPP |

This item lets you set the parallel port mode. The mode options are **Normal** (Standard and Bidirection Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port). Normal is the IBM AT and PS/2 compatible mode. EPP enhances the parallel port throughput by directly writing/reading data to/from parallel port without latch. ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

### Integrated Peripherals à ECP Mode Use DMA

| **ECP Mode Use DMA** |
|---|
| 3 |
| 1 |

This item lets you set the DMA channel of ECP mode.

### Integrated Peripherals à CPU Thermal (Temp.)

| **CPU Thermal (Temp.)** |
|---|
| Ignore |
| Monitor |

This function lets you control the **Thermal Detection** function. When you set this option to Monitor and the temperature of CPU exceeds 55°C, then:

1. The PC speaker will beep 5 times.
2. The CPU cycle timer will descend about 35%.

***Note:****The CPU cycle timer won't be restored to the original status until you reset the system.*

## 3.10 Password Setting

Password prevents unauthorized use of your computer. If you set a password, the system prompts for the correct password before boot or access to Setup.

To set a password:

1. At the prompt, type your password. Your password can be up to 8 alphanumeric characters. When you type the characters, they appear as asterisks on the password screen box.
2. After typing the password, press.
3. At the next prompt, re-type your password and press again to confirm the new password. After the password entry, the screen automatically reverts to the main screen.

To disable the password, press when prompted to enter the password. The screen displays a message confirming that the password has been disabled.

## 3.11 IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this function to detect its parameters and enter them into the "Standard CMOS Setup" automatically.

This routine only detects one set of parameters for your IDE hard drive. Some IDE drives can use more than one set of parameters. If your hard disk is formatted using different parameters than those detected, you have to enter the parameters manually. If the parameters listed do not match the ones used to format the disk, the information on that disk will not be accessible. If the auto-detected parameters displayed do not match those that used for your drive, ignore them. Type N to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

## 3.12 Save & Exit Setup

This function automatically saves all CMOS values before leaving Setup.

## 3.13 Exit without Saving

Use this function to exit Setup without saving the CMOS value changes. Do not use this option if you want to save the new configuration.

## 3.14 NCR SCSI BIOS and Drivers

The NCR 53C810 SCSI BIOS resides in the same flash memory chip as the system BIOS. The onboard NCR SCSI BIOS is used to support NCR 53C810 SCSI control card without BIOS code. The NCR SCSI BIOS directly supports DOS, Windows 3.1 and OS/2. For better system performance, you may use the drivers that come with the NCR SCSI card or with your operating system. For details, refer to the installation manual of your NCR 53C810 SCSI card.

## 3.15 BIOS Flash Utility

The BIOS Flash utility allows you to upgrade the system BIOS. To get the AOpen Flash utility and the upgrade BIOS file, contact your local distributor or visit our homepage at **http://www.aopen.com.tw**. Please make sure that you have the correct BIOS ready, the BIOS filename is normally like AP58R110.BIN, which means model AP58 BIOS revision 1.10.

There are two useful programs, Checksum utility CHECKSUM.EXE and AOpen Flash utility AOFLASH.EXE. Follow the procedures below to upgrade your BIOS.

[CHECKSUM.EXE]

This utility will help you to determine if the BIOS has been downloaded correctly or not.

1. Execute
   C:> CHECKSUM Biosfile.bin
   Biosfile.bin is the filename of the BIOS code. (for example, AP58R110.BIN)
2. The utility will show "Checksum is ssss".
3. Compare the "ssss" with original checksum posted on Web or BBS. If they are different, please do not proceed any further and try to download the BIOS again.

# AWARD BIOS

[AOFLASH.EXE]

This utility will try to check the mainboard model, BIOS version and Super/Ultra IO chip model. To ensure the correct BIOS file for the correct mainboard and IO chip. This utility will permanently replace your original BIOS content after flashing.

1. Bootup DOS from floppy without loading any memory manager (HIMEM, EMM386, QEMM386, ...).
2. Execute

   C:> AOFLASH Biosfile.bin

   Biosfile.bin is the filename of the BIOS code. (for example, AP58R110.BIN)
3. After loading the new BIOS code, the utility will prompt you to save original BIOS code into your HDD or floppy. Please press "Y" to store it as "BIOS.OLD".
4. After the old BIOS has been successfully saved, press "Y" to replace BIOS.
5. DO NOT turn off the power during "FLASHING".
6. Reboot the system by turn off the power after "FLASHING".
7. Press "DEL" key to enter BIOS setup during POST.
8. Reload the "BIOS SETUP DEFAULT" and reconfigure other items as previous set.
9. Save & Exit. Done!

***Warning:*** *DO NOT turn off the power during "FLASHING". If the BIOS programming is not successfully finished, the system will not be boot again, and you may need to physically replace the BIOS chip.*

***Tip:*** *You may load back original BIOS "BIOS.OLD" by the same procedure.*

# Appendix A

# Jumper Table Summary

## Setting the CPU Voltage

| JP11 | CPU Core Voltage (Vcore) |
|---|---|
| 1-2 | 3.45V (Intel P54C or IDT C6) |
| 3-4 | 3.52V (Cyrix 6x86 ,AMD K5 or IDT C6) |
| 5-6 | 2.9V (AMD K6-166/200 or Cyrix M2) |
| 7-8 | 2.8V (MMX P55C or Cyrix 6x86L) |
| 9-10 | 3.2V (AMD K6-233) |
| 11-12 | 2.2V (AMD K6-266/300) |

***Warning:*** *Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6-200/233 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.*

***Warning****: If your CPU is IDT C6, note that this processor supports one of two voltage range, 3.135 ~ 3.465V ( 3.45V) and 3.45 ~ 3.6V ( 3.52V). See the CPU specification to set the correct voltage.*

***Tip:*** *Normally, for single voltage CPU, Vcpuio (CPU I/O Voltage) is equal to Vcore, but for CPU that needs dual voltage such as PP/MT (P55C) or Cyrix 6x86L, Vcpuio is different from Vcore and must be set to Vio (PBSRAM and Chipset Voltage). The single or dual voltage CPU is automatically detected by hardware circuit.*

| CPU | Type | JP11 | Vcore |
|---|---|---|---|

# Jumper Table Summary

| | | | |
|---|---|---|---|
| INTEL P54C | Single Voltage | 1-2 | 3.45V |
| INTEL MMX P55C | Dual Voltage | 7-8 | 2.8V |
| AMD K5 | Single Voltage | 3-4 | 3.52V |
| AMD K6-166/200 | Dual Voltage | 5-6 | 2.9V |
| AMD K6-233 | Dual Voltage | 9-10 | 3.2V |
| AMD K6-266/300 | Dual Voltage | 11-12 | 2.2V |
| Cyrix 6x86 | Single Voltage | 3-4 | 3.52V |
| Cyrix 6x86L | Dual Voltage | 7-8 | 2.8V |
| Cyrix M2 | Dual Voltage | 5-6 | 2.9V |
| IDT C6 | Single Voltage | 1-2<br>3-4 | 3.45V<br>3.52V |

## Selecting the CPU Frequency

| JP3 | JP2 | JP1 | CPU Frequency Ratio |
|---|---|---|---|
| 1-2 | 1-2 | 1-2 | 1.5x (3.5x) |
| 1-2 | 1-2 | 2-3 | 2x |
| 1-2 | 2-3 | 2-3 | 2.5x (1.75x) |
| 1-2 | 2-3 | 1-2 | 3x |
| 2-3 | 1-2 | 2-3 | 4x |
| 2-3 | 2-3 | 2-3 | 4.5x |
| 2-3 | 2-3 | 1-2 | 5x |
| 2-3 | 1-2 | 1-2 | 5.5x |

| JP6 | JP5 | JP4 | CPU External Clock |
|---|---|---|---|
| 1-2 | 2-3 | 2-3 | 50MHz |
| 2-3 | 2-3 | 2-3 | 55MHz |
| 1-2 | 2-3 | 1-2 | 60MHz |
| 1-2 | 1-2 | 2-3 | 66MHz |
| 2-3 | 2-3 | 1-2 | 75MHz |
| 2-3 | 1-2 | 2-3 | 83.3MHz |

***Note:*** *Intel PP/MT MMX 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio.*

***Warning:*** *SIS 5582 chipset supports up to 75MHz external CPU bus clock, the 83.3MHz settings are for internal test only, set to 83.3MHz exceeds the specification of SIS 5582 chipset, which may cause serious system damage.*

| INTEL Pentium | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| P54C 75 | 75MHz = | 1.5x | 50MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 2-3 |
| P54C 90 | 90MHz = | 1.5x | 60MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 1-2 |
| P54C 100 | 100MHz = | 1.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| P54C 120 | 120MHz = | 2x | 60MHz | 1-2 & 1-2 & 2-3 | 1-2 & 2-3 & 1-2 |
| P54C 133 | 133MHz = | 2x | 66MHz | 1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3 |
| P54C 150 | 150MHz = | 2.5x | 60MHz | 1-2 & 2-3 & 2-3 | 1-2 & 2-3 & 1-2 |
| P54C 166 | 166MHz = | 2.5x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |
| P54C 200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |

| **INTEL Pentium** | **CPU Core Frequency** | **Ratio** | **External Bus Clock** | **JP3 & JP2 & JP1** | **JP6 & JP5 & JP4** |
|---|---|---|---|---|---|
| PP/MT 150 | 150MHz = | 2.5x | 60MHz | 1-2 & 2-3 & 2-3 | 1-2 & 2-3 & 1-2 |
| PP/MT 166 | 166MHz = | 2.5x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |
| PP/MT 200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |
| PP/MT 233 | 233MHz = | 3.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |

| **Cyrix 6x86 & 6x86L** | **CPU Core Frequency** | **Ratio** | **External Bus Clock** | **JP3 & JP2 & JP1** | **JP6 & JP5 & JP4** |
|---|---|---|---|---|---|
| P120+ | 100MHz = | 2x | 50MHz | 1-2 & 1-2 & 2-3 | 1-2 & 2-3 & 2-3 |
| P133+ | 110MHz= | 2x | 55MHz | 1-2 & 1-2 & 2-3 | 2-3 & 2-3 & 2-3 |
| P150+ | 120MHz = | 2x | 60MHz | 1-2 & 1-2 & 2-3 | 1-2 & 2-3 & 1-2 |
| P166+ | 133MHz = | 2x | 66MHz | 1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3 |
| P200+ | 150MHz = | 2x | 75MHz | 1-2 & 1-2 & 2-3 | 2-3 & 2-3 & 1-2 |

| **Cyrix M2** | **CPU Core Frequency** | **Ratio** | **External Bus Clock** | **JP3 & JP2 & JP1** | **JP6 & JP5 & JP4** |
|---|---|---|---|---|---|
| MX-PR166 | 150MHz = | 2.5x | 60MHz | 1-2 & 2-3 & 2-3 | 1-2 & 2-3 & 1-2 |
| 6x86-MX200 | 166MHz=<br>150MHz= | 2.5x<br>2x | 66MHz<br>75MHz | 1-2 & 2-3 & 2-3<br>1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3<br>2-3 & 2-3 & 1-2 |
| 6x86-MX233 | 200MHz=<br>166MHz | 3x<br>2x | 66MHz<br>83.3MHz | 1-2 & 2-3 & 1-2<br>1-2 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3<br>2-3 & 1-2 & 2-3 |
| MX-PR266 | 233MHz = | 3.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |

# Jumper Table Summary

| AMD K5 | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| PR75 | 75MHz= | 1.5x | 50MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 2-3 |
| PR90 | 90MHz = | 1.5x | 60MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 1-2 |
| PR100 | 100MHz = | 1.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR120 | 90MHz = | 1.5x | 60MHz | 1-2 & 1-2 & 1-2 | 1-2 & 2-3 & 1-2 |
| PR133 | 100MHz = | 1.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR166 | 116MHz = | 1.75x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |

| AMD K6 | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| PR2-166 | 166MHz = | 2.5x | 66MHz | 1-2 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |
| PR2-200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR2-233 | 233MHz = | 3.5x | 66MHz | 1-2 & 1-2 & 1-2 | 1-2 & 1-2 & 2-3 |
| PR2-266 | 266MHz= | 4x | 66MHz | 2-3 & 1-2 & 2-3 | 1-2 & 1-2 & 2-3 |
| PR2-300 | 300MHz= | 4.5x | 66MHz | 2-3 & 2-3 & 2-3 | 1-2 & 1-2 & 2-3 |

| IDT C6 | CPU Core Frequency | Ratio | External Bus Clock | JP3 & JP2 & JP1 | JP6 & JP5 & JP4 |
|---|---|---|---|---|---|
| C6-150 | 150MHz = | 2x | 75MHz | 1-2 & 1-2 & 2-3 | 2-3 & 2-3 & 1-2 |
| C6-180 | 180MHz = | 3x | 60MHz | 1-2 & 2-3 & 1-2 | 1-2 & 2-3 & 1-2 |
| C6-200 | 200MHz = | 3x | 66MHz | 1-2 & 2-3 & 1-2 | 1-2 & 1-2 & 2-3 |

## Selecting the PCI Clock Mode

| JP8 | PCI Clcok Mode |
|---|---|
| 1-2 | Sync (default) |
| 2-3 | Async |

## Disabling the Onboard Super I/O

| JP18 | Onboard Super I/O |
|---|---|
| 1-2 | Enable (default) |
| 2-3 | Disable |

## Clear CMOS

| JP14 | Clear CMOS |
|---|---|
| 1-2 | Normal operation (default) |
| 2-3 | Clear CMOS |

## Setting PCI Clock

| JP8 | PCI Clock |
|---|---|
| 1-2 | Sync (default) |
| 2-3 | Async |

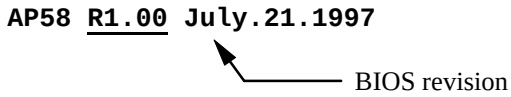
# *Appendix B*

# Frequently Asked Question

***Note:*** *FAQ may be updated without notice. If you cannot find the information that you need in this appendix, visit our WWW home page (**http://www.aopen.com.tw**) and check the FAQ area and other new information.*

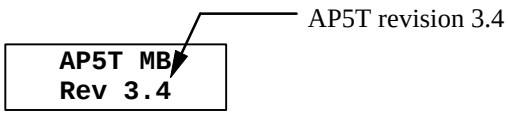
**Q: How can I identify the mainboard BIOS version?**

A: The AOpen mainboard BIOS version appears on the upper-left corner of the POST (Power-On Self Test) screen. Normally, it starts with R and is found in between the model name and the date. For example:




**Q: How can I identify version of the mainboard?**

A: The AOpen mainboard revision appears as Rev x.x on the PCB, near the PCI slot. For example, for AP5T revision 3.4, the revision number appears on the PCB as follows:



# Frequently Asked Questions

**Q: Why the AOpen mainboards (MB) do not have cache module expansion slot?**

A: Faster CPU speed requires more difficult and complex MB timing design. Every trace and components delay must be taken into consideration. The expansion cache slot design will cause 2 or 3ns delay in PBSRAM timing, and the extended trace length to the cache module through the golden finger will further delay the timing by 1 or 2ns. This may result in unreliable system once the cache module and slot becomes worn. All AOpen MBs support 512KB PBSRAM onboard. For better performance (around 3% higher than 256KB), we strongly recommend you to use 512KB onboard. Otherwise, reliable 256KB is better than unreliable 512KB with cache module. AOpen is the first company to promote this concept since the fourth quarter of 1995.

**Q: What is MMX?**

A: MMX is the new single-line multiple-instruction technology of the new Intel Pentium PP/MT (P55C) CPU. A new Pentium Pro CPU (Klamath) with MMX technology is also expected to be released soon. The MMX instructions are specifically useful for multimedia applications (such as 3D video, 3D sound, video conference). The performance can be improved if applications use these instructions. All AOpen MBs have at least dual power onboard to support PP/MT, it is not necessary to have special chipset for MMX CPU.

**Q: What is USB (Universal Serial Bus)?**

A: USB is a new 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s) such as keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, the traditional complex cables from back panel of your PC can be eliminated.

You need the USB driver to support USB device(s). AOpen MBs are all USB ready, you may get latest BIOS from AOpen web site (http://www.aopen.com.tw). Our latest BIOS includes the keyboard driver (called Legacy mode), that simulates USB keyboard to act as AT or PS/2 keyboard and makes it possible to use USB keyboard if you don't have driver in your OS. For other USB devices, you may get the drivers from your device vendor or from OS (such as Win95). Be sure to turn off "USB Legacy Support" in BIOS "Chipset Setup" if you have another driver in your OS.

**Q: What is P1394?**

A: P1394 (IEEE 1394) is another standard of high-speed serial peripheral bus. Unlike low or medium speed USB, P1394 supports 50 to 1000Mbit/s and can be used for video camera, disk and LAN. Since P1394 is still under development, , there is no P1394 device currently available in the PC market. Also, there is no chipset that can support P1394. Probably in the near future, a card will be developed to support P1394 device.

**Q: What is SMBus (System Management Bus, also called I2C bus)?**

A: SMBus is a two-wire bus developed for component communication (especially for semiconductor IC). It is most useful for notebook to detect component status and replace hardware configuration pin (pull-high or pull-low). For example, disabling clock of DIMM that does not exist, or detecting battery low condition. The data transfer rate of SMBus is only 100Kbit/s, it allows one host to communicate with CPU and many masters and slaves to send/receive message. The SMBus may be used for jumpless mainboard, the components which support SMbus are not ready yet, we will keep eyes on it.

**Q: What is FCC DoC (Declaration of Conformity)?**

A: The DoC is new certification standard of FCC regulations. This new standard allows DIY component (such as mainboard) to apply DoC label separately without a shielding of housing. The rule to test mainboard for DoC is to remove housing and test it with regulation 47 CFR 15.31. The DoC test of mainboard is more difficult than traditional FCC test. If the mainboard passes DoC test, that means it has very low EMI radiation and you can use any kind of housing (even paper housing). Following is an example of DoC label.

**Q: What is PBSRAM (Pipelined Burst SRAM)?**

A: For Pentium CPU, the Burst means reading four QWord (Quad-word, 4x16 = 64 bits) continuously with only the first address decoded by SRAM. The PBSRAM will automatically send the remaining three QWord to CPU according to predefined sequence. The normal address decoding time for SRAM is 2 to 3 clocks. This makes the CPU data read timing of four QWord to be at least 3-2-2-2 and a total of 9 clocks if traditional asynchronous SRAM is used. However, with PBSRAM, there is no need to decode address for rest three Qword. Therefore, data read timing can be 3-1-1-1, that is equivalent to 6 clocks and is faster than asynchronous SRAM.

**Q: What is EDO (Extended Data Output) memory?**

A: The EDO DRAM technology of EDO is actually very similar to FPM (Fast Page Mode). Unlike traditional FPM that tri-states the memory output data to start the pre-charge activity, EDO DRAM holds the memory data valid until the next memory access cycle, that is similar to pipeline effect and reduces one clock state.

**Q: What is SDRAM (Synchronous DRAM)?**

A: The SDRAM is a new generation DRAM technology that allows DRAM to use the same clock as the CPU host bus (EDO and FPM are asynchronous and do not have clock signal). The idea is the same as "Burst" (refer to the previous Q & A). It requires only one clock for the 2nd, 3rd, and 4th QWord (for example, 5-1-1-1 compares with EDO 5-2-2-2). The SDRAM comes in 64-bit 168-pin DIMM (Dual-in-line Memory Module) and operates at 3.3V. Note that some old DIMMs are made by FPM/EDO and only operate at 5V. Do not confuse them with SDRAM DIMM. AOpen is the first company to support dual-SDRAM DIMMs onboard (AP5V), from Q1 1996.

**Q: Can SDRAM DIMM work together with FPM/EDO SIMM?**

A: The FPM/EDO operate at 5V while SDRAM operates at 3.3V. The current MB design provides different power to DIMM and SIMM but connects the data bus together. If you combine SIMM and DIMM, the system will still work fine; however, only temporarily. After a few months, the SDRAM 3.3V data input will be damaged by 5V FPM/EDO data output line. Therefore, we strongly NOT recommend DIMM and SIMM combined together. There is one exception, if your SDRAM supports 5V tolerance (such as TI or Samsung), which accepts 5V signal at 3.3V operating power, you can combine them.

| Manufacturer | Model | Suggested CAS Latency Time | 5V Tolerance |
|---|---|---|---|
| Samsung | KM416S1120AT-G12 | 2 | Yes |
| NEC | D4516161G5-A12-7JF | 2 | No |
| Micron | MT4LC1M16E5TG-6 | 2 | No |
| TI | TMS626162DGE -15 | 2 | Yes |
| TI | TMS626162DGE M-67 | 3 | Yes |

**Q: What is Bus Master IDE (DMA mode)?**

A: The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device

transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode. Note that it is different with master/slave mode of the IDE device connection. For more details, refer to section 2.3 "Connectors".

**Q: What is the Ultra DMA/33?**

A: This is the new specification to improve IDE HDD data transfer rate. Unlike traditional PIO mode, which only uses the rising edge of IDE command signal to transfer data, the DMA/33 uses both rising edge and falling edge. Hence, the data transfer rate is double of the PIO mode 4 or DMA mode 2. (16.6MB/s x2 = 33MB/s).

The following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

| Mode | Clock per 33MHz PCI | Clock count | Cycle time | Data Transfer rate |
|---|---|---|---|---|
| PIO mode 0 | 30ns | 20 | 600ns | (1/600ns) x 2byte = 3.3MB/s |
| PIO mode 1 | 30ns | 13 | 383ns | (1/383ns) x 2byte = 5.2MB/s |
| PIO mode 2 | 30ns | 8 | 240ns | (1/240ns) x 2byte = 8.3MB/s |
| PIO mode 3 | 30ns | 6 | 180ns | (1/180ns) x 2byte = 11.1MB/s |
| PIO mode 4 | 30ns | 4 | 120ns | (1/120ns) x 2byte = 16.6MB/s |

| Mode | Clock per 33MHz PCI | Clock count | Cycle time | Data Transfer rate |
|---|---|---|---|---|
| DMA mode 0 | 30ns | 16 | 480ns | (1/480ns) x 2byte = 4.16MB/s |
| DMA mode 1 | 30ns | 5 | 150ns | (1/150ns) x 2byte = 13.3MB/s |
| DMA mode 2 | 30ns | 4 | 120ns | (1/120ns) x 2byte = 16.6MB/s |
| DMA/33 | 30ns | 4 | 120ns | (1/120ns) x 2byte x2 = 33MB/s |

**Q: What is PnP (Plug and Play)?**

A: In the past, the IRQ/DMA and memory or I/O space of add-on cards are normally set manually, i.e., by jumper or by proprietary utility. The user has to check the user's guide for the correct setting. Sometimes, resource conflict occurs and this leads to unstable system. The PnP specification suggests a standard register interface for both BIOS and OS (such as

Win95). These registers are used by BIOS and OS to configure system resource and prevent any conflicts. The IRQ/DMA/Memory will be automatically allocated by PnP BIOS or OS.

Currently, almost all the PCI cards and most ISA cards are PnP compliant. If you are still using a Legacy ISA card that cannot support PnP, set the corresponding resource (IRQ/DMA/memory) to ISA in the BIOS "PCI/PnP Setup".

**Q: What is ACPI (Advanced Configuration & Power Interface) and OnNow?**

A: The ACPI is new power management specification of 1997 (PC97). It intends to save more power by taking full control of power management to operating system and not through BIOS. Because of this, the chipset or super I/O chip needs to provide standard register interface to OS (such as Win97) and provides the ability for OS to shutdown and resume power of different part of chip. The idea is a bit similar to the PnP register interface.

ACPI defines momentary soft power switch to control the power state transition. Most likely, it uses the ATX form factor with momentary soft power switch. The most attractive part of ACPI for desktop user is probably the "OnNow" feature, an idea from notebook. This feature allows you to immediately resume to your original work without the long time waiting from bootup, entering Win95 and running Winword. The AX5T with Intel TX chipset can support ACPI.

**Q: What is the AGP (Accelerated Graphic Port)?**

A: AGP is a PCI-like bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. The AGP uses both rising and falling edge of the 66MHz clock and produces 66MHz x 4byte x 2 = 528MB/s data transfer rate. The AOpen AX6L MB are designed to support AGP via the new Intel Klamath LX chipset.

**Q: Which Pentium chipset has the best performance?**

A: The performance difference of chipset depends on what kind of DRAM they use and the DRAM timing they support. (They all use PBSRAM, so that the difference is very little at 2nd level cache.)

The following table lists the read timing of current available chipsets. The four digital represents the clocks needed for 1st-2nd-3rd-4th QWord. Notice that the Intel HX + EDO or SIS 5571+ EDO are almost the same as VX + SDRAM and the TX + SDRAM has the best performance among Pentium chipsets. Please note AP57 does not support SDRAM.

| P5 Chipset | Model | PBSRAM | FPM | EDO | SDRAM |
|---|---|---|---|---|---|
| Intel 430FX | AP5C/P | 3-1-1-1 | 7-3-3-3 | 7-2-2-2 | NA |
| Intel 430VX | AP5VM/ AP5V | 3-1-1-1 | 6-3-3-3 | 6-2-2-2 | 6-1-1-1 |
| Intel 430HX | AP53/ AP5K/ AX53 | 3-1-1-1 | 6-3-3-3 | 5-2-2-2 | NA |
| Intel 430TX | AP5T/ AX5T | 3-1-1-1 | 6-3-3-3 | 5-2-2-2 | **5-1-1-1** |
| SIS 5571 | AP57 | 3-1-1-1 | 5-3-3-3 | 4/5-2-2-2 | (6/7-1-1-1) |
| SIS 5582 | AP58/ AX58 | 3-1-1-1 | 5-3-3-3 | 4/5-2-2-2 | 6/7-1-1-1 |

**Q: Does Pentium or Pentium Pro MB support Deturbo mode?**

A: The Deturbo mode was originally designed to slow down CPU speed for old applications (especially old games). It uses programming loop to wait or delay special event. This programming method is considered very bad since the delay of loop highly depends on the CPU speed and the application fails at high-speed CPU. Almost all new applications (including games) use RTC or interrupt to wait event. There is no need for Deturbo mode now. The Turbo switch is now used as Suspend switch. However, some MBs still support Turbo/Deturbo function via keyboard. You can set the system to Deturbo by pressing <Ctrl> <Alt> <->. To back to Turbo mode, press <Ctrl> <Alt> <+>. Note that the Deturbo mode has been removed in new MBs since these require more code space in Flash ROM.

# Frequently Asked Questions

**Q: Power Management Icon does not appear in the Windows 95 Control Panel even though the APM under BIOS Setup is enabled.**

A: This problem occurs if you did not enable the APM function before you install Windows 95. If you have already installed Windows 95, re-install it after the BIOS APM function is enabled.

**Q: Why does the system fail to go into suspend mode under Win95?**

A: This problem may be caused by your CDROM settings. The CDROM Auto Insert Notification of Win95 is dafault enabled, the system will continue to monitor your CDROM, auto-execute application when a CD diskette is loaded, and prevents the system from entering into suspend mode. To resolve this, go into Control Panel ➔ System ➔ Device Manager ➔ CDROM ➔ Setting, and disable the "Auto Insert Notification" function.

**Q: What is Windows 95 Registry?**

A: The functions of Windows 95 Registry and the Windows 3.1 INI files are almost the same. Both store the hardware and software configurations. The only difference is that Registry is a database while INI is text file. You can run REGEDIT.EXE to further understand the Registry structure. Checking and studying the structure of this file will help you solve some configuration problems.

**Q: Which version of the Windows '95 that I am using?**

A: You may determine the version of Windows '95 by following steps.

1. Double click "System" in "Control Panel".
2. Click "General".
3. Look for "System" heading & refer to following,

| | |
|---|---|
| 4.00.950 | Windows 95 |
| 4.00.950A | Windows 95 + Service Pack or OEM Service Release 1 |
| 4.00.950B | OEM Service Release 2 or OEM Service Release 2.1 |

If you are running OSR 2.1, you may tell it from by checking "USB Supplement to OSR2" in the list of installed program of Add/Remove program tool under Control Panel, and checking for version 4.03.1212 of the Ntkern.vxd file in the Windows\System\Vmm32 folder.

**Q: What is the Modem Wake Up?**

A: With the help of ACPI OnNow and ATX soft power On/Off, it is possible to have system totally power off (The traditional suspend mode of power management function does not really turn off the system power supply), and wakeup to automatically answer a phone call such as answering machine or to send/receive fax. You may identify the true power off by checking fan of your power supply. Both external box modem and internal modem card can be used to support Modem Wake Up, but if you use external modem, you have to keep the box modem always power-on. AOpen AX5T/AX58 and internal modem card implement special circuit (patent applied) and make sure the modem card works properly without any power. We recommend you choose AOpen modem card (F56 or MP56) for Modem Wake Up applications.

**Q: What is the Suspend to Hard Drive?**

A: This is the same as Notebook. You can resume your original work directly from hard disk without go through the Win95 booting process and run your application again. Suspend to Hard Drive saves your current work (system status, memory image) into hard disk. If your memory is 16MB, normally, you need to reserve at least 16MB HDD space to save your memory image. ACPI OnNow is possible to do the same function, since the ACPI specification is not fully ready. AOpen AP5T/AP58/AX5T/AX58 support Suspend to Hard Drive through BIOS. Note that you have to use VESA compatible VGA (AOpen S3 Trio64V+ PV60), Sound Blaster compatible sound card (AOpen AW32 or AW35) for Suspend to Hard Drive to work properly. Of course, we recommend to use AOpen products for maximum compatibility.

**Q: What is CPU Thermal Protection?**

A: The higher speed of CPU , the more heat dissipation need to be taking into consideration. If user does not use correct fan for the CPU cooling, it is highly possible the CPU can over heat and causing system unstable. AOpen AP5T/AP58/AX5T/AX6F has special thermal detection circuit under the CPU, and slow down the CPU speed as well as warning when temperature is high then a predefined temperature. (Normally, 55 degree C.)